British Guiana.

DIVISIONAL REPORTS

OF THE

DEPARTMENT OF AGRICULTURE,

FOR THE YEAR

1936.

GEORGETOWN, DEMERARA:
PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA.
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1938.

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Sugar.

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NOTE.—Each report also contains its table of contents.

NOTE.

THE absence on leave of the Plant Breeder and his subsequent resignation has precluded any report from this officer being included in the Divisional Reports for the year 1936. In consequence there is no complete review herein of the breeding and variety work with rice. Reference, however, should be made to the *Agricultural Journal of British Guiana* (Rice Number) for June, 1936, and the March, 1937, number of the same publication.

J. SYDNEY DASH,
Director of Agriculture.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE BERBICE DIVISION FOR THE YEAR 1936.

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REPORT ON THE BERBICE DIVISION FOR THE YEAR 1936.

STAFF.

J. D. Gillespie, B.Sc. —Agricultural Superintendent.
E. M. Morgan —Agricultural Instructor (on leave).
H. B. France —Agricultural Assistant.
R. R. Ross —Rice Grading Examiner.

Mr. H. B. France was granted vacation leave in March and returned to the district in November.

Mr. Gillespie was granted vacation leave as from November 15, and Mr. H. Macluskie, Agricultural Superintendent, relieved him at that date.

2. Owing to Mr. Morgan's absence from the Colony on extended sick leave and to the fact that Mr. France, prior to going on leave in March, was in a bad state of health, most of the district work between Abary and No. 50 Corantyne devolved on the Agricultural Superintendent. This coupled with the fact that during the year travelling had to be restricted to the barest minimum, combined to make the work in the district this year appear more arduous than usual.

3. In the month of April, Mr. E. G. Benson, Assistant Superintendent was transferred from Essequibo to West Coast, Berbice, where he took up residence, but relinquished duty in this district when he was re-transferred to Essequibo in November.

4. The Rice Grading at Springlands and most of the district work between No. 50 and Crabwood Creek are carried out by Mr. R. R. Ross, who resides at No. 63, a suitable centre for his area.

GENERAL.

5. In plotting a graph of the rainfall in Berbice for this year and comparing it with the rainfall for the past 40 years it is striking to note that in no month has it been normal. Up to the middle of March the weather, though dry, was not unusual for Berbice. In the latter half of the month, however, rain fell in torrents and, in the experience of many planters long connected with sugar in this country, the grinding season in the spring of 1936 was carried through under the most adverse weather conditions in memory. To the rice planters the heavy and sudden fall of rain at a time when the shied rice crop had only just been sown, came as a calamity, and, on the West Coast, Berbice, wiped out approximately 4,000 acres of rice and which entirely drowned all the padi sown on the left bank of the Abary river. The rains continued until August and then stopped suddenly, thus causing the growing rice, which was at that time only developing because of the delay in planting due to the difficulty in draining off the water which fell during March, to ripen immaturely and yield a very diminished crop.

CROP CONDITIONS.

Sugar.

6. In spite of what has been said about the weather conditions at the beginning of the year most sugar estates finished the year with a very good average yield.

In 1935, 23,504 acres were under cultivation in Berbice of which 22,769 acres were reaped producing 75,963 tons sugar. In 1936, the area under cultivation was 26,374 acres—25,848 acres on the sugar estates and 526 acres under farmers canes. The area reaped was 23,702 acres, of which 23,176 acres were on the sugar estates and the remainder under farmers' canes, producing a yield of 78,831 tons sugar.

Rice.

7. The acreage under rice has fallen from 32,971 acres in 1935 to 23,125 acres for the Autumn crop in 1936. This drop in acreage was occasioned, as mentioned above, by the rainfall in March which drowned the seeds already planted and for some time made resowing impossible.

8. An approximate figure for yield would be 14 bags (140 lb. each) per acre. It is probable that the short crop this season and the necessity to meet their more pressing creditors, coupled with the fact that the rice may have to be sold at a time when the market is not favourable, may lead to a shortage in seed for next season's crop. This will be particularly felt on the West Coast, Berbice where, at the present moment there is a sufficiency of good seed of the No. 79 variety, which, however, it is felt may be milled and sold as rice unless some scheme is evolved which will allow the retention of that seed for sowing next year. In the other areas the farmers are more alive to the need for helping themselves and will, it is thought, reserve sufficient padi for seed purposes.

Coconuts.

9. This continues to be a remunerative crop in Berbice. The area under coconuts for 1936 was 3,557 English acres as against 3,660 acres in 1935. This crop has suffered in various ways this year.

10. In the area between No. 50 and No. 60 there was an attack of Locusts. In the month of July many trees were practically defoliated. The attack was reported when the insects had got as far as climbing up the walls of the houses. The outbreak was reported to the Government Entomologist who visited the scene and personally conducted an effort by the villagers to combat the pest. Previous to this visit, however, attempts were made by the District Officers to get the villagers interested in trying to save their own crop, but the general feeling appeared to be that Government ought to remunerate the farmers for catching the locusts. This attack was almost concurrent with a severe visitation of Coconut Caterpillar which particularly played havoc in the Ulverston—Salton area. As in the case of locusts, farmers were not inclined to do anything themselves to combat the pest.

Ground Provisions.

11. The cultivation of these crops—including cassava, corn, eddoes, etc. remains practically the same as in previous years. The market prices are hardly sufficient to make it worth the farmers labour bringing the produce to town and the crops are principally grown for home consumption. There is a certain demand for provisions in the New Amsterdam market thus encouraging the growing of these crops on the lower reaches of the Berbice river or within reach of any of the larger estate markets. Otherwise the cultivations are limited.

12. The actual returned acreage for 1936 was 2,816 acres, as against 3,028 acres in 1935.

Citrus.

13. The demand for budded grapefruit and orange plants has been very much less this year. The established areas have, however, done very well and the fruits have found a ready sale on the local market. The area under limes was returned at 498 acres and for other citrus and fruit at 364 acres.

LIVESTOCK.

14. The return of livestock in Berbice which at best may only be given approximately, shows that the number has decreased from 41,128 head in 1935 to 38,580 head in 1936. The decision of Government to enforce the Pounds Ordinance in normal seasons so as to accustom owners to the necessity for caring their animals has resulted in the erection of a number of fences alongside the roads in some areas. It is to be hoped that this first step will lead to greater attention being paid to cattle in this district.

There has been a decrease in the number of sheep kept in 1936, 17,421 were returned as against 19,970 head for 1935.

Swine.

The returns for this type of livestock are 10,694 as against 10,212 in 1935. The increase in the interest shown in the manufacture of crude coconut oil from which the by-products make such excellent pig-food may account for the fact that fewer "razor-backs" are seen on the Corentyne Coast as formerly.

DISTRICT WORK.

Sugar.

15. During the year the following sugar cane work has been carried out in Berbice in collaboration with the Sugar Agronomist:

Variety Trials.—Two variety trials have been laid down in Berbice this year, viz.:—

On August 12, a variety trial composed of the following varieties:—4/28, 11/28, 50/30, 49/30, 66/30, 182/30, and with P.O.J. 2878 as control was laid down in field No. 7 Ankerville West, Plantation Port Mourant.

On September 22, a variety trial was planted in field No. 15 Ankerville Old Land, Plantation Port Mourant. This trial contains six replications of each of the following eight varieties:—M.P.R. 145, T 2020, T 1198, F.C. 998, M.P.R. 49, P.O.J. 2878, F.C. 916, and M.P.R. 151.

16. The following variety trials have been reaped in Berbice during the year.

On March 17, the second ratoon crop was reaped from the variety trial in field No. 28 Ankerville Empolder.

On March 19, the second ratoon crop was reaped from the variety trial in field No. 15 Ankerville Old Land, Plantation Port Mourant.

At Plantation Blairmont, a variety trial was reaped in field Rampoor No. 24, in November.

17. *Manurial Trials.*—At Plantation Port Mourant in field No. 23 Resource a complex manurial trial of various treatments of sulphate of ammonia, sulphate of potash and superphosphate of lime was planted on August 13, to P.O.J. 2878 and the manures at various dressings of 0, 2, 3, 4 and 6 cwts. per acre were applied on September 8.

In November a manurial trial in field Rampoor No. 26 Plantation Blairmont was reaped.

At Plantation Rose Hall a similar trial was laid down in field No. 81 Rose Hall. This trial was planted on January 11, and the manures were applied on January 28. It was reaped in December.

Full particulars of these experiments will be found in the Sugar Agronomist's report.

Rice.

18. *Pure Line Seed Padi.*—The work in this connection lies in growing, purchasing, storing and distributing seed to farmers. At the beginning of this year there were in the bonds at Whim and New Amsterdam, approximately 80 bags of No. 79 and 80 bags of Demerara Creole seed padi grown by the Department at Whim Sub-Station and at Prospect, Plantation Rose Hall. The padi was stored in bags unwinnowed, as it has been found that there is less loss through weevils and other pests of stored padi when the padi is dried carefully and stored without cleaning; 15 per cent. may be taken as an approximate figure for this loss over the period from reaping to sowing. Bags are 140 lb. each.

19. From seed farmers who had taken pure line seed from the Department in 1934 and grown it under supervision, there were bought, after very careful analysis of purity and germinating and after winnowing, about 500 bags of No. 79 seed padi of not less than 95 per cent. purity. The germination was about the same percentage.

20. Apart from the above, 40 bags of a high quality Demerara Creole seed padi were purchased for despatch to West Demerara along with 30 bags from the Department's bond. The balance of this variety was distributed to West Coast, Berbice.

21. Of the total of 580 bags of No. 79 available 100 bags were purchased on behalf of a miller on the Corentyne Coast and 28 bags which were being reserved for the Abary, but which were not required when the rains came and flooded out that area, were distributed to the same purchaser. 42 bags were delivered to Prospect.

22. 200 bags were sold on credit to the farmers at Plantation Washington, West Coast, Berbice, where, despite the flooding and consequent loss of the entire crop in certain areas, 160 acres of practically pure line No. 79 were established. With this nucleus it is hoped to put into operation a scheme for the distribution throughout the West Coast, Berbice, of a padi of a purity previously unknown in that area.

23. Apart from the 200 bags mentioned above 160 bags of seed padi were distributed on the West Coast, Berbice. Some of this was sold to members of the four Co-operative Credit Banks on the Coast as part of their loans.

24. On the upper Corentyne Coast 50 bags of seed were loaned to farmers through millers.

25. On the lower Corentyne Coast a great deal of help has been given to the distribution of pure line padi by the Proprietors of the several estates. Plantation Rose Hall bought and distributed 95 bags of No. 79 padi this year on areas extending from No. 19 East Coast, Berbice, to Adelphi on the East Canje. In fact the distribution on this latter area has served for the spread of seed to the upper limits of rice cultivation on the East Canje district.

26. Another proprietor who has assisted the dissemination of pure line seed in 1936 is Mr. Hanoman, proprietor of Nos. 9 and 11 East Coast, Berbice, where he gave out to his tenants this year 14 bags of No. 79 seed. On the upper end of the Corantyne at No. 49, the proprietor, Mr. Iloo has encouraged his tenants to extend the growing of pure seed of either of the two proved varieties.

27. *Pure Line Seed Blocks.*—For distribution to farmers in 1937 the Department has grown this year two blocks each of approximately 4 acres of pure line hand selected seed. The area of Demerara Creole padi grown at Whim Sub-Station gave a yield of 90 bags approximately of clean dry padi. The other area planted to No. 79 variety has yielded 80 bags. In addition, 500 bags of No. 79 padi were purchased from farmers after the autumn crop for distribution in 1937.

28. Padi available for distribution at the date of writing is located as follows :—

Whim Bond	... 90	Bags Demerara Creole*
,,	... 50	,, No. 79*
New Amsterdam	... 80	,, No. 79*
Bath Estate Bond	...200	,, No. 79*
Plantation Washington	...250	,, No. 79

The Department is grateful to the Manager of Plantation Bath for storing padi in the estate's bond.

29. *Variety Trials.*—Three trials were attempted in Berbice during 1936.

*Not yet winnowed.

(*a*) *West Coast Berbice.*—A broadcast variety trial was contemplated on this Coast. Eight varieties were included in the trial among which were those varieties which had shown promise in previous broadcast trials. Owing to the unexpected rainfall in March which completely flooded the site chosen for this trial, along with all the other rice land on the West Coast of Berbice it was impossible to establish the trial. Later, however, when the rains had begun to abate an attempt was made to carry out the experiment as a planted trial. Nurseries were made and the land for the trial, was ploughed. The planting was done on July 22, but the early termination of the wet season causing a short crop in other areas brought about the entire loss of this trial.

(*b*) *No. 63, Upper Corantyne.*—Another broadcast trial, carried out this time with better success, but still far from the ideal conditions for rice growing, was put down on land on Mr. Rohoman's estate at No. 63. This portion of land, though situated too far aback to ensure easy access and thus more expensive to carry out, was, however, much more suitable than that used last year. The lay-out of this trial was the same as that used in other trials and an 8 x 8 Latin Square.

The trial was shown on May 1 with the following results :—

Variety.		Yield bags per acre.
No. 79	...	... 32.1
D. 114	...	... 29.5
Demerara Creole	...	... 28.
Blue Stick	...	... 26.6
Ramcajara Pure Line	...	... 26.1
D. 228	...	... 26.
Ramcajara Local	...	... 23.4
Kalyaman	...	... 23.2

(*c*) *Whim Sub-Station.*—Planted variety trial. The varieties used were those which, in last year's trials, showed the most promise among those varieties suited to local planting conditions. These include D. 114, D. 91, D. 110, No. 75, Kalyaman and Blue Stick with No. 79 and Demerara Creole as controls.

The seed for this trial was sown in the nursery beds on April 23, 1936, but was adversely affected by the inability to change the irrigation water sufficiently often (the land at Whim which was only taken in last year still shows sign of the presence of salt in the soil as there was insufficient water or rain during the time between rice seasons to wash the land to any extent), and of the eight varieties, three, namely Blue Stick, D. 91 and Demerara Creole had to be re-sown. This delayed the planting to a certain extent but usefully indicated that No. 79 is hardly affected in its germination by the presence of salt, which is prevalent throughout the Coast of Berbice. In the month of May the seedlings in the nurseries were attacked by rice caterpillars and the land had consequently to be kept flooded. This practice enable the seedlings to remain alive but further retarded their growth. Eventually the trial was transplanted on July 2. Previous to planting the land had been very carefully prepared and thus it was only necessary te give one light weeding. This was done in August. The growth of the plants was good throughout the trial and there was always a marked difference in the appearance of the different varieties. D 110 outgrew the others in height with D. 114 a close second.

The plots flowered between September 5 and 14. No one variety was over all eight plots noticeably earlier than any other, although on an average it might be said that D. 110 was the first and D. 114 the last to flower. Reaping was carried out on November 26, under ideal weather.

The results show that there are two or three varieties which, judged by yield of padi per acre, are about equal in quality, but when one takes into account such factors as had to be dealt with this year, *i.e.*, saltiness in the land, over-abundance

or shortage of water, it may be safely said that No. 79 is a good all-round padi for cultivation in Berbice although in yield it was four bags per acre behind the leading padi.

Taking the results of the planted trial at Whim by themselves it would appear as though D.91 is worthy of further investigation. The results are as follows :—

	Bags (140 lb.) per acre.
D.91	... 33.1
D.110 ...	... 32.8
Demerara Creole ...	... 32.7
Kalyaman ...	... 30.3
Blue Stick ...	... 29.8
No. 75 ...	... 29.3
No. 79 ...	... 28.7
D.114 ...	... 28.1

29. *Padi Competitions*—These were five in number.

(1) At No. 70 Corentyne Coast the quality of the padi produced in previous years was so bad that it was decided to promote a competition among the growers in the 1936 autumn crop. The farmers showed a keen interest in the competition and altogether 4¼ bags of seed padi were sold to competitors.

In all five competitions the judging was done on the following points :—

Nursery practice	...	... 40%
Purity of padi	...	... 40%
Yield	...	... 20%

Visits were paid by the officers concerned at various times while the competition was running and the prizes were distributed after the final judging to the following.

Beni-persaud	...	First Prize $15
A. Rahaman	...	Second Prize $10
Hadaitullah	...	Third Prize $ 5
Ramgahon	...	Fourth Prize $ 3

The prizes were distributed, in this case on October 30 by Mr. Ramjohn who may be said to have helped more than anyone else the spread of pure line No. 79 padi in that area.

(2) The competition on the Lower Corentyne Coast was conducted at Nos. 9 and 11, the estate of Mr. Hanoman where 14 bags of pure line No. 79 were distributed this year. This competition attracted nine entrants all of whom strove hard up to the last to win the honours.

The competition was judged on the same points as in the previous case, except that 1.5 marks were taken off nursery work and added to yield. The yields in this case were very satisfactory. The first prize winner reaped 21.5 bags of padi of 143 lb. from each bed, equivalent to a yield of 28-30 bags per acre.

The prize winners were the following : —

Chattergoon	...	First Prize $15
G. Klass	...	Second Prize $10
Jackdeo	...	Third Prize $ 5
Dwarka	...	Fourth Prize $ 3

Through the helpfulness of the President of The Berbice Chamber of Commerce and Development Association (Mr. C. Farrar) the prizes for this competition were distributed on Friday, November 5 by the Chairman of the meeting (Mr. D. S. Aikman) of the Association.

(3) *Cotton Tree, West Coast, Berbice.*—The competition was open to the villagers in the area and the Village Overseer was very helpful in assisting at the organisation.

The successful entrants were :—

Abdool Sakur	...	First Prize—$15
Ramnarase	...	Second Prize—$10
A. Houssaine	...	Third Prize—$5
Ramjanally	...	Fourth Prize—$3

(4) *Washington, West Coast Berbice.*—In this instance the competitors were tenants of the Hon. Peer Bacchus with whose co-operation the enterprise was carried out.

The prize-winners were the following ;—

Oscar Gravesande	...First Prize—$15
Charles Whinfield	...Second Prize—$10
Patience Moore Ben Mackenzie Quibi Williams	} Third and Fourth Prizes—$8.

(5) *Belladrum—Golden Fleece.*—This is another country district and the competitors all villagers. The Chairman of the Village proved very helpful in the establishment of this competition.

The prize-winners were as follows : —

A. J. Carvahol	...	First Prize—$15.
P. W. Wilson	...	Second Prize—$10.
Johnny Hassan	...	Third Prize—$5.
Cheddy	...	Fourth Prize—$3.

30. *Rice Grading*—Rice Grading was not done at New Amsterdam during the year, although on one or two occasions samples of rice have been analysed to give an unofficial indication of their grade. At Springlands the following grading was done ;—

No. 2 ...	... 2,900 Bags
No. 3 ...	... 10,850 „

Of these quantities, 10,050 bags No. 3 went to Guadeloupe, 2,300 bags to Martinique and 600 bags to Barbados.

School Gardens.

31. *Auchlyne.*—This garden though handicapped during the year by the absence of the teacher in Georgetown undergoing the Rural Science and Elementary Agricultural Courses and, more lately, by the dry spell which has lasted for such a long time, has been carried on and an attempt made to work the garden on a more co-operative system. This was done by dividing the garden and the class which attended into quarters. In each quarter of the garden those boys who were responsible for it had to draw up their own programme of work which was only put into operation after consultation with the teacher and Agricultural Superintendent.

32. *Edinburgh.*—School garden work at Edinburgh was also held up to a certain extent by the teacher taking the course at Georgetown. Seeds have been ordered and received from abroad but there has been no money available to buy manure for the garden.

33. *Unaided Gardens.*—Of these the best are to be found at the Roman Catholic Boys' School in New Amsterdam, at the Anglican School at No. 1 Corantyne, and at the Scots School at Sisters Village, East Bank, Berbice.

34. At the end of November a sum of $93 was allocated for the establishment of three more aided gardens at Port Mourant Roman Catholic, New Amsterdam Roman Catholic and Albion Canadian Mission Schools and which it is hoped are destined to enter the ranks of aided gardens in 1937. The sum was not wholly adequate but was spent to the best advantage by fitting out each school with tools in the first place. New Amsterdam and Port Mourant Roman Catholic Schools were provided with tool sheds and the former garden was fenced while the latter was dug over in preparation. At the Canadian School at Albion nothing could be done as a new school site is contemplated in 1937 and it was considered wise to await the new building's erection. Materials for fencing, however, were procured and are being stored in readiness for erection later.

Co-operative Credit Banks.

35. There are eight Banks in the district of which four are under the Chairmanship of the Assistant Agricultural Superintendent on the West Coast, Berbice, and the others are under the Agricultural Superintendent. Later owing to the Assistant Agricultural Superintendent's removal to Essequibo the Assistant Registrar of Banks was appointed Chairman of the West Coast Banks.

36. Of the banks on the Corentyne Coast, two, *i.e.*, those at Rose Hall, and Skeldon are in a comparitively flourishing state. The Bloomfield–Salton Bank requires close attention and the Eversham Bank is small and marking time.

EXPERIMENT STATIONS.

Whim.

37. The sand reef has been given over almost completely to the cultivation of those garden plants which yield fruits and seeds suitable for distribution to farmers.

38. The following distributions have been made during the year.

Onion seedlings ...	... 2,604
Egg Plant (seedlings) ...	... 312
Egg plant (seeds) ...	... 1½ lb.
Tomato (seedlings) ...	... 84 lb.
Cabbage („) ...	... 60
Sweet Potato (Cuttings) ...	... 14,000
Assorted Vegetable Seeds...	... 27¼ lb.
Black eye peas ...	... 16 lb.
Cow Peas ...	... 56 lb.
Bonavist ...	... 18 lb.
Pigeon Peas ...	... 10 lb.
Ginger ...	... 20 lb.
Yam (cuttings) ...	... 4 lb.

39. In addition, this station's value as a demonstration area is increasing. Plots of various vegetables are grown in order to determine the most suitable variety for local use. Successful heads of cauliflowers were grown of the Maincrop Patna variety. It is hoped by means of the present trial in progress whereby seed is being sown monthly, to ascertain the most suitable time of year of planting for this particular crop. Cabbages, Tomato, Beet, Carrots and Onions have been successfully grown and as hitherto, various legumes were also grown and the seeds distributed to farmers widely.

Sub-station Macaw.

40. The Oil Palms on this station have flowered this year but no fruits have been borne. The banana nursery has been maintained.

MISCELLANEOUS.

41. *Visitors.*— His Excellency the Governor visited the district on various occasions and was accompanied on a journey up the Berbice river to the Crabwood Creek rice area, to the Experiment Station at Whim and the Corentyne River. Meetings of farmers were held at various centres including the West Coast of Berbice.

42. The Director of Agriculture and Deputy Director made various visits of inspection and other officers of the Department were also met during their tours.

43. *Public Gardens.*—The Public Gardens, Colony House, have been maintained by a small allocation from Departmental funds and flowers and plants have been supplied during the year.

44. *Demonstration Apiaries.*– Three of these, were established at New Amsterdam Public Gardens, Whim Experiment Station and No. 63 Corentyne. It is hoped that from these nuclei other hives will be installed by individuals interested in beekeeping.

45. *Correspondence and reports.*—855 items of correspondence were received and 878 issued.

Reports submitted during the year included :—

Report on visit to Nickerie in connection with mechanical rice production ; Rice mills survey data ; Monthly progress reports while the census returns were compiled.

46. *Acknowledgment.*—It is a pleasure to acknowledge the loyal co-operation of the Staff during the year.

JAMES D. GILLESPIE,
Agricultural Superintendent, Berbice.

February 21, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE EAST DEMERARA DIVISION FOR THE YEAR 1936.

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REPORT ON THE EAST DEMERARA DIVISION FOR THE YEAR 1936.

STAFF.

E. M. Peterkin —Agricultural Superintendent.
C. C. Dowding, F.L.S., F.R.H.S.—Agricultural Instructor, Lower East Coast.
W. A. Bovell —Agricultural Instructor, Upper East Coast.
J. Indrobeharry —Agricultural Assistant, Experiment Station.

GENERAL.

The Agricultural Superintendent, was absent from the Colony on vacation leave from February 15 to June 4. He supervised the work of the Rice Station, Georgetown, from June 18 to December 31, during the absence on leave from the Colony of the Plant Breeder, Mr. L. E. Codd, M.Sc. He also acted Deputy Director from December 20 to 31.

CROP CONDITIONS.

Sugar.

2. The increase in the area under this crop mentioned in 1935 still continues. The long spell of dry weather during the latter part of the year hampered reaping, there being a shortage of water in the navigation canals. The farmers generally complained of the canes weighing light. One or two heavy rains in December improved reaping conditions. The acreage reaped, including farmers' canes, was 14,821 acres.

Rice.

3. The spring crop was small. The greater part of the autumn crop was planted in good time, there were only a few stragglers. The total estimated acreage was 11,701 acres with a yield of 180,819 bags (140 lb.).

4. *Mahaica–Abary District.*—Large areas were lost due to excessive dry weather during the heading period. No. 79 is the variety generally grown and it was interesting to note how well it stood up to these conditions. In the majority of cases the loss was unavoidable, but there were many instances where there was undeniable evidence that the water available was wantonly wasted. The main trouble is the irregularity in time of planting, and the selfishness of individuals—there being a total disregard of other persons' requirements; the lack of co-operation is very striking. On the few places where the water supply was carefully supervised the yields were good.

5. *Lower East Coast.*—The prolonged dry weather resulted in an ideal reaping season; the yields and quality were good. Pln. Hope surpassed its previous record for its standard of purity in "Demerara Creole."

Coconuts.

6. The increase in price of coconuts and copra has resulted in weeding and bushing being carried out on many estates, an important item in cultivation which has been neglected for several years. Quite an appreciable new area has come into bearing. Most of this new area consists of trees grown from selected nuts, the benefit of which is easily discerned in the quality of the nuts.

7. The manufacture of coconut oil is being carried out by a large number of small farmers. Large numbers of nuts are being bought by them, but the manufacturing plants are very crude. The by-product is fed to pigs, the number of which has greatly increased. Large numbers of select nuts are being shipped as "nuts."

8. Brassolis control measures are more efficient; most of the large estates maintain inspection gangs, and the small holders are giving less trouble in carrying out instructions.

9. The industry as a whole shows signs of activity and prosperity. The acreage under coconuts in East Demerara was 11,692 acres.

EXPERIMENT STATION, GEORGETOWN

Ground Provisions and Vegetables.

10. *Bananas.*—The collection remains as it was in 1933, viz.: Apple, Red Fig, Jamaica, Sucre, Cayenne, Gros Michel, Dwarf, Giant Fig, Congo, Lacatan, Large Fig, Small Fig, Sour Fig, Cocorite, Chan-A-Sue (N.W.D.), Martinique (N.W.D.), Red Jamaica, Lady's Finger, Almedo, Dacca, Rubra (India), Siam, Ramkela, Palembang, Celat, Serah (Indian Archipelago), Rajah (India), Martaban, Pisang Su-Su (Singapore), Cinera Seramphur and Martabanica.

The Dwarf and Gros Michel bananas planted in the flood fallowed section are fruiting. Records are being kept of the number of hands and weight of each bunch. The clumps are carefully pruned.

11. *Plantains.*—The collection remains the same as previously listed, viz.;—Apple, Surinam, Horse, Giant, Black, Pink, White.

12. *Cassava.*—The collection of varieties and types mentioned in the 1935 report is being kept up and added to as occasion permits.

Mangoes.

13. The collection of grafted mangoes planted in South Field are making satisfactory growth, a few are somewhat backward. The collection now consists of the following:—

Julie	24
Mrs. White	3
Jamaica No. 11	5
Mrs. Dare	1
Graham	2
Pere Louis	3
Bombay Black (Essequibo)...	3
Peach	4
Bangalore	1
D'Or	3
Ceylon	1
Colonial Bank	1
Clementi	1
Divine	1
Peters or Bombay	1
Lorieau	1
Cambodiana	2
Cherie	2
Gordon	2
Bombay Purple	2

One Divine died. One D'Or and two Bombay Purple were added to the collection during the year. The following varieties fruited: All of the Julie freely; Mrs. White a few; Jamaica No. 11 a few; Mrs. Dare a few; Graham a few; Pere Louis one; Bangalore freely, Colonial Bank one; Cherie a few; Peach a few. This area is additional to the old collection on the fruit dams at the Station.

Tobacco.

14. Owing to a severe attack of Mosaic in 1935 no tobacco was grown on the Station this year.

Green Manures.

15. *Indigofera endecaphylla* has been extended on the Station and has made excellent growth; large quantities of cuttings have been given away. This is undoubtedly the most satisfactory of all the legumes tried as a cover crop for orchards, coconuts, etc., as well as being extremely useful for planting on banks between fodder

grasses, *e.g.* Guatemala Grass. Very small areas of the following are being grown :— *Crotalaria spectabilis, C. usarameensis, C. striata, C. sp., Indigofera hirsuta, I. endecaphylla, I. sp., Dolichos hosei, Centrosema pubescens, Calapagonium mucunoides, Pueraria javanica* and *Tephrosia hookeriana.*

Pigeon Peas.

16. The following plots sown in 1936 are now fruiting :—Dominica White, Dominica Brown, Barbados White, Barbados Brown, Accibenos, Mites, Hawaii White, Hawaii Brown, Silvios White, Silvios Brown, Trinidad and Type 1 (India).

Papaws.

17. The following varieties are being grown :—Panama, Walcott, Panama x Walcott, Walcott x Panama, Local (long), Red Flesh from Canal Zone, Porto Rico.

Chilli Peppers.

18. A large number of types have been obtained from time to time from India Palestine, Egypt, Canada and Mexico. The Plant Breeder has been working on these. There are now growing on the Station eighteen selections made from the best of these ; none are of any outstanding excellence. The plots were sown in August.

SUB-STATION CECILIA.

19. The work of this sub-station has been satisfactorily maintained. The number of visitors during the year was 648.

Tomatoes.

20. The following varieties were under trial ;—Early Market, Guernsey Champion, Bonny Best, Marglobe and Beefheart.

The results are given in Table I.

TABLE I.

Variety.	Country of Origin.	Date Sown.	Date Transplanted.	Reaping Period.	No. of Stems.	Area Sq. ft.	Yield per Plot. Lb.	Yield per Acre. Lb.	Prevalence of Blossom-end rot.	Prevalence of Mosaic.
Early Market ...	England	15.11.35	9.12.35	11 2 to 16.4.36	2	576	210	15,881	very slight	very slight
Guernsey Champion.	England	15.11.35	9.12.35	4.2 to 16.4.36	2	864	400	20,167	do.	do.
Marglobe ...	U.S.A.	15.11.35	27.12.35	27.2 to 7.5.36	2	576	83	6,277	do.	do.
Bonny Best ...	U.S.A.	15.11.35	11.12.35	8.2 to 6.4.36	2	576	98	7,411	do.	do.
Beefheart ...	U.S.A.	15.11.35	21.12 35	29.2 to 7.5.36	2	288	75	11,344	do.	do.

21. The Guernsey tomato shows every sign of success—the fruit is of medium size, similar to the Early Market ; it has been replanted with seed obtained from selectedfruit. The larger salad types do not give such good yields and the fruit are not so smooth. A further trial has been laid down for reaping in 1937.

Onions.

22. The following table gives the results of varieties tried out during the year.

TABLE II.

Variety.	Country of Origin.	Date Sown.	Date Transplanted.	Date Reaped.	Area Sq, ft.	Yield per Plot lb.	Yield per Acre lb.	Prevalence of Thrips.
White ...	Teneriffe ...	15.11.35	16.12.35	9.4. to 24.4.36	240	12	2,178	Severe.
Red ...	Teneriffe ...	15.11.35	16.12.35	9.4. to 24.4.36	480	19	1,724	Very severe.
Yellow Bermuda ...	Teneriffe ...	23. 1.36	24. 2.36	30. 5.36	155	8	2,248	Slight.
Crystal White Wax	Teneriffe ...	23. 1.36	24. 2.36	30. 5.36	95	5	2,293	do.
Varela's Purple ...	Teneriffe ...	23. 1.36	24. 2.36	30. 5.36	30	1¾	2,541	do.

Besides these, Red Madras and Red Bombay were grown for seed which was distributed to farmers. White Eschallot was also cultivated for distribution.

This year thrips caused considerable damage, in some cases destroying the plant altogether. The thrips were controlled eventually by spraying.

Soya Beans.

23. The following table shows the results obtained from the several varieties tried.

TABLE III.

Variety.	Date Sown.	Date Reaped.	Area Sq. ft.	Yield per Plot. lb.	Yield per Acre lb.	Germination.
White Caracas ..	13.1 36	20-27.4	532	20	1,638	Fair.
Mandarin ...	13.1.36	28.3- 9.4	133	4	1,310	Very poor
Wisconsin Black ...	13.1.36	28.3- 9.4	133	3⅜	1,105	Poor.
O.A.C. 211 ...	13.1.36	28.3- 9.4	133	5	1,638	Fair.
Manchu ...	13.1.36	28.3- 9.4	133	4	1,310	Very poor.
Nanksoi No. 332 ...	24.1.36	20-28.4	185	7⅛	1,691	Fair.

An experiment has been laid out in duplicate of equi-sized plots on November 20, 1936, these will be reaped in February, 1937.

Legumes.

24. The following are being cultivated on the station for seed distribution ;— Lima No. 3, Nigeria, Henderson Bush Lima, White Lima, Variegated Lima, Yard Bean, Waby Bean, Bush Bonavist, Dwarf Bonavist, Sem, Sinebone, Blackeye Peas, Cowpeas. The following table shows results of some new varieties.

TABLE IV.

Name.	Origin.	Date Sown.	Date Reaped.	Area Sq. ft.	Yield per Plot. lb. oz.	Yield per Acre lb.
Pois Vingtmille ...	Martinique ...	2.6.36	19.9—18.11	144	9	170
Pois Souche ...	do ...	2.6.36	19.9—18.11	144	1 1	340
Haricot Maugetout de la Valle	do ...	2.6.36	14 8—20.8	288	1 6	208
F.P.I. 92053 Adsuki Bean ...	U.S.A. ...	8.5 36	10.7—31.7	144	1 7	435
F.P.I. 21645 Adsuki Bean ...	do ...	8.5.36	10 7—31.7	144	15	284
F.P.I. 21596 ...	do ...	8.5.36	10.7—31.7	144	2 6	718
F.P.I. 87592 ...	do ...	8.5.36	10.7—31.7	144	1 7	435
Tepary Bean ...	S. Africa ...	17.3 36	20.5—29.5	480	1 8	136
Cluster Bean ...	India ...	26.3.36	10.7—19.11	240	4	45
Red Pea ...	Jamaica ...	25.1.36	28.3—9.4.36	185	1 8	353

The Cluster Bean fruited freely, but the pods were affected by a fungus and the seeds were spoilt.

Other Crops.

25. *Ground Nuts.*—"Virginia Bunch" was obtained from North Carolina ; sown March 17, reaped August 28 ; area 780 sq. feet ; yield 51 lb. equal to 2,848 lb. per acre ; badly affected by a fungus ; all infected plants were destroyed. This has been resown on a new site.

26. *Sweet Potatoes.*—There is still a demand for cuttings.

27. *Grapes.*—A good crop was reaped, and the vines were pruned in July.

Apiary.

28. Three hives were started in July, and instruction is being given to those interested in Apiculture.

DISTRICT WORK.

Cane Farming.

29. The interest taken in cane farming is still very keen ; the areas in all the villages are steadily increasing ; in Plaisance, if there were proper transport facilities the area would have quadrupled in twelve months. During the year 24,700 cuttings of Diamond 10 were obtained from the Sugar Experiment Station and distributed free.

Rice.

30. The standard in the quality of padi grown is being maintained. A large area of pure line was lost in the Mahaica-Abary District due to the excessive dry weather during the end of the year ; approximately 3,000 acres of pure line were lost. The quantities of seed distributed during 1936 are as under :

Seed grown in District Block	...	60	bags (140 lb. each).
Seed grown at Central Rice Station	...	358	„ „
		418	bags.

The number of seed farms established in East Demerara was 47.

31. The usual five-acre block of pure line No. 79 was grown at Pln. Nonpareil and yielded 125 bags for distribution in 1937. A variety trial was laid down at Pln. Hope by the Plant Breeder. The results are published in the Agricultural Journal of British Guiana, Vol. VIII, No. 1, March, 1937.

Plantains.

32. The fruit still continues to be disfigured by scarification on the skin caused by a small beetle ; bunches badly marked are almost unsaleable. Yields have been satisfactory and prices fair for good clean fruit.

Bananas.

33. Farmers still talk of the future of a banana export industry, but none are prepared to grow any large area of bananas, they consider it the duty of Government to do so ; this is a fortunate phase in this district as there are no soils suitable for this crop.

Minor Crops.

34. *Ground Provisions.*—In cane farming villages there is a slight decrease.

35. *Tomatoes.*—It is impossible to arouse any real enthusiasm over this crop; the little interest taken is very disappointing.

36. *Onions.*—A few farmers continue to grow onions and are quite satisfied with results ; the majority consider it a troublesome crop.

37. *Peas & Beans.*—The position remains unchanged ; very little interest is taken.

Lodge Allotments.

38. All the allotment-holders are paying rent at the rate of 24 cents per allotment per annum ; there were 90 allotments taken up during 1936. Considerable difficulty is still being experienced with the cleaning of irrigation and drainage trenches.

School Gardens.

39. The work in School Gardens continues to improve, the teachers and pupils are evincing greater interest. It is a pleasure to report the establishment of home gardens by many of the pupils. Not only the schools with a grant-in-aid are doing well, but many schools without a subsidy have started gardens. They are all paid periodical visits by the District Officers and vegetable seed is distributed free when available.

CROP PESTS.

40. *Sugar Cane.*—Aphis is still prevalent in Beterverwagting, the damage done appears to be slight.

41. *Rice.*—Birds are still a serious pest.

42. *Coconuts.—Brassolis* was present at Unity and Lancaster, Letter T, Park, Little Abary and Catherineville.

43. *Plantains and Bananas.*—Beetles continue to be a serious menace.

CO-OPERATIVE CREDIT BANKS.

44. The Agricultural Superintendent continued the Chairmanship of the Plaisance-Sparendaam, Beterverwagting-Triumph and Buxton-Friendship Co-operative Credit Banks during the year and relinquished the Chairmanship of the Georgetown Bank. Monthly meetings were held at each bank and numerous visits had also to be paid to deal with other business.

45. Mr. C. C. Dowding, Agricultural Instructor, also continued the Chairmanship of the Ann's Grove, Golden Grove and Victoria Banks, and acted as Chairman of the Plaisance-Sparendaam, Beterverwagting-Triumph and Buxton-Friendship Banks while the Agriculture Superintendent was on leave from February 15 to June 4.

AGRICULTURAL EDUCATION.

Competitions.

46. During the year two Rice Farmers' Competitions were held in the East Demerara District, one on the Lower East Coast and the other in the Mahaica-Mahaicony District.

47. *Lower East Coast.*—There were 77 entrants made up as follows:—Nonpareil 20, Foulis 15, Enmore 1, Belfield 1, Hope 33, Clonbrook 2, Unity and Lancaster 2, Springhall 3. The rules governing these competitions were carefully explained, all cultural operations supervised and advice given. Marks were awarded after each operation in two series (*a*) field work and (*b*) storage, as follows:—

Field.

Preparation of Nursery	...	...	40
Attention given to rogueing	...	...	40
Yield	...	...	20

Storage.

Quantity of seed reserved for seed farm in relation to area required for 1937	...	...	50
Quality of seed stored	...	...	20
Method of storage	...	...	15
Immunity from weevil and padi moth		...	15

48. The following table gives the results of the competitors who completed the course:

Name.	Locality.	Variety.	Preparation of Nursery. (40)	Attention to Roguing and Purity of Padi. (40)	Yield. (20)	Quantity of Seed reserved for seed farm in relation to area required for 1937. (50)	Quality of seed stored. (20)	Method of Storage. (15)	Immunity from weevils and padi moth. (15)	Total. (200)	Bags of 140 lb. ½ acre.
Gootoo ...	Hope ...	D.C. ...	39	35	14	45	16	12	15	176	14
Seepersaud ...	Hope ...	D.C. ...	38	35	14	45	16	12	15	175	13⅝
Ragoo ...	Foulis ...	No. 79 ...	36	35	16	45	16	12	15	175	16
Karansingh ...	Nonpareil	No. 79 ...	32	36	17	45	17	12	15	174	17
Pramasar ...	Foulis ...	No. 79 ...	34	35	15	45	16	13	15	173	14½
Ramotar ...	Hope ...	D.C. ...	35	35	15	45	16	12	15	173	15
Boodoo ...	Hope ...	D.C. ...	35	35	15	45	16	12	15	173	15
Arjoon ...	Enmore ...	No. 79 ...	39	35	15	45	16	12	15	172	15
Guyadeen ...	Hope ...	D.C. ...	35	35	14	45	16	12	15	172	14¼
Alli Hoosein ...	Hope ...	D.C. ...	35	35	13	45	16	12	15	171	12⅝
Bassier ...	Hope ...	D.C. ...	35	35	12	45	16	12	15	170	12½
Joe ...	Hope ...	D.C. ...	30	35	15	45	16	12	15	168	14½
Suydeen ...	Hope ...	D.C. ...	30	35	14	45	16	12	15	167	14⅛
Bachnie Bausi ...	Hope ...	D.C. ...	30	35	14	45	16	12	15	167	13⅛
Argune ...	Hope ...	D.C. ...	30	35	13	45	16	12	15	166	13
Seepersaud Mana..	Hope ...	D.C. ...	30	35	13	45	16	12	15	166	12⅝
Imrit ...	Hope ...	D.C. ...	30	35	13	45	16	12	15	166	13¼
Lakhan ...	Hope ...	D.C. ...	30	35	12	45	16	12	15	165	12
Sookul ..	Hope ...	D.C. ...	30	35	12	45	16	12	15	165	11½
Mannie Tomby ...	Hope ...	D.C. ...	30	35	11	45	16	12	15	164	11
Ramnarine ...	Hope ...	D.C. ...	30	35	11	45	16	12	15	164	11
Sookdeo ...	Hope ...	D.C. ...	30	35	11	45	16	12	15	165	10½
Rampersaud ...	Lancaster	No. 79 ...	34	30	15	40	16	13	15	163	14½

49. *Mahaica-Abary District.*—The competition in this District was almost wiped out by excessive dry weather ; most of the competitors suffered a total loss. Of the few remaining, F. Madray won the First Prize. Mr. Madray has competed every year since the inauguration of these competitions, but this is the first time that he has won the competition.

SEED DISTRIBUTION.

50. Plants, cuttings and seeds of field crops distributed from the Central Station alone during the period under review to farmers and others throughout the Colony are given in the following summary :

Padi	59,000	lb.
Peas and Beans	25	,,
Tobacco	½	,,
Banana (suckers)	80	
Plantain (suckers)	20	
Cassava (cuttings)...	100	
Papaw (seedlings)...	55	
Coconuts	6	
Onion seed	22	lb.
Fodder Plants.		
Demerara Primrose	1,000	plants.
Guatemala grass	300	tops.
Uba Cane	300	,,
Indigofera endecaphylla	10,000	cuttings.

51. The following plants, seeds and cuttings were distributed from Sub-Station Cecilia during the year : —

Sweet Potato (cuttings)	60,000	
Sweet Potato (tubers)	300	lb.
Peas and Beans	180	,,
Tomato (seedlings)	2,000	
Tomato (seed)	2	lb.
Tomato (fruit)	500	
Onion (seed)	1	lb.
Onion (seedlings)	1,500	
Eschalot	12	lb.
Swiss Chard (seedlings)	200	
Assorted vegetable seed	2½	lb.
Papaw seed	10	oz.
Papaw (seedlings)...	60	
Tobacco seed	½	lb.

SEED AND PLANT INTRODUCTION.

52. The undermentioned seeds were received during the year :—

Papaw—" Red Fleshed "—from Canal Zone, Panama.
Soya Bean—" Nanksoy 332 "—Nanking, China.
Red Peas—from Jamaica Agricultural Society.
Mauritius Peas—from Trinidad.
Tomato—" Glovel "—University of Florida, U.S.A.
Musk Melon—from Trinidad.
Cauliflower—" Early Market " from Sutton's, India.
Onion—" Red Globe "—from Sutton's, India.
Onion—" Red " and " White "—Teneriffe.
Tannia—4 varieties—Barbados.
Padi—4 varieties—Sierra Leone through Kew.
Padi—26 varieties—from Brazil.

E. M. PETERKIN,
Agricultural Superintendent,
East Demerara.

March 15, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE WEST DEMERARA DIVISION FOR THE YEAR 1936.

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REPORT ON THE WEST DEMERARA DIVISION FOR THE YEAR 1936.

STAFF.

A. A. Abraham, —Agricultural Superintendent.

GENERAL.

In November of this year this division was extended to include the islands of the Wakenaam and Leguan district.

3. From January to November weather conditions, combined with a sufficiency of irrigation water, were very favourable to the growing of the major crops, namely sugar-cane and padi. The spring and autumn padi crops were cultivated and harvested under ideal weather conditions. The seasons being normal, the sugar-cane crops also made good progress.

4. In December, however, the rainfall was very heavy, the mean precipitation in the division during this month being 20 inches and 33 parts. This caused flooding on the farms in the Canals Polder area, and in consequence, the provision crops suffered to a great extent, the loss of the cassava crop being heaviest.

5. Regular visits were continued throughout the year to the farms in the Canals Polder. Agricultural instructions were directed chiefly towards the improved production of marketable coffee. During these courses of instruction, the coffee growers were also advised in the preparation of coffee exhibits for the coffee competitions which were held in December.

6. The Agricultural Associations in the division were encouraged and the opportunity was taken to attend their meetings whenever possible. These meetings provided useful occasions for offering advice to the farmers and for the farmers to exchange views on farm practices.

7. The quarterly meetings of the "West Demerara Chairmen's Union" were held regularly during the year. At the meeting held in April the Agricultural Superintendent read a paper entitled "Village Livelihood in British Guiana."

8. A survey was made of the lands of the west bank section for the purposes of selecting sites for the experimental cultivation of Gros Michel Bananas, and for establishing a farm unit. A five-acre plot was selected at Pln. Middlesex—Canal No. 2 for the banana experiments, and a block of five acres at Pln. Toevlugt, typical of the surrounding agricultural areas, was selected to establish the farm unit. This model cultivation would have for its object the demonstration of the practicability of establishing an homestead on the basis of a family unit.

9. The Agricultural Superintendent served on a sub-committee under the Chairmanship of the Deputy Director of Agriculture in connection with the plantain export trade.

10. On October 5 a gath ering of padi cultivators took place at the Department's seed farm at Plantation Vreed-en-Hoop. The Deputy Director of Agriculture was in attendance and gave a lecture on padi cultivation, emphasising the value of the cultivation of pure line seed padi. The visitors were conducted over the cultivation and showed much interest in the work of the seed farm and in the variety trial being carried out.

11. The issue in July of the "Farm Journal"—the new publication of the Department of Agriculture—met with favourable reception by the farmers and the general community. At the end of the year, 187 subscribers had been enrolled in this division, and there was scope for further enrollment.

12. During the year, agricultural competitions in padi and coffee were held. The padi competitions were held in order to encourage the production of pure line seed, and the coffee competitions to awaken interest in the preparation of an improved commercial product. The results of these competitions were very satisfactory.

13. Labour conditions were normal throughout the year. This enabled cane-cutting operations on the West Demerara sugar estates to progress satisfactorily.

CROP CONDITIONS.

Sugar.

14. The cultivation of the sugar estates in West Demerara was well maintained during the year. There being no shortage of labour, progress was uninterrupted.

15. The area under cane cultivation for 1936 was 15,031 acres. 13,987 acres were reaped as compared with 13,242 acres in 1935.

16. The principal varieties grown during the year under review were Diamond 10, P.O.J. 2878 and D.625, the Diamond 10 variety predominating. The yield of this variety at Plantation Leonora on the West Coast during the spring crop was 3.23 tons of sugar per acre and at Plantation Versailles, on the West Bank, 3.56 tons. The mean yield of Diamond 10 for the autumn crop was 3.47 tons per acre. The 24-acre block of reclaimed flood-fallow land at Plantation Schoon Ord planted with Diamond 10 in September, 1935, and reaped in the autumn of 1936 yielded 3.74 tons of sugar per acre. At this estate it is proposed to replace D.625 by the cultivation of Diamond 10.

17. It is noteworthy that Plantation Tuschen has more than doubled its output during 1936. The contributing factors were increased cultivation due to land reclaimed at the Zeevlugt section which was given up to second growth vegetation for approximately 20 years, and the cultivation of P.O.J. 2878 and Diamond 10. The returns of this estate for 1936 were 2,077 tons of sugar as against 976 tons in 1934.

Rice.

18. Both seasons for the cultivation of this cereal were very favourable. The harvest on both occasions was early, therefore the crop was reaped and stored before the succeeding heavy December rains came on. Although the rice market remained depressed throughout the year, the acreages under padi cultivation were not materially reduced. The total area reaped was 8,950 acres with an estimated yield of 144,541 bags (of 140 lb.) as compared with 10,445 acres in 1935 with an estimated yield of 181,680 bags. The Demerara Creole variety padi was largely grown in this division during 1936.

Coffee and Cacao.

19. No extension of the cultivation of these minor crops was carried out during the year. Coffee conditions remained the same. Some loss by flooding, however, occurred during the December rains with regard to berries picked for pulping and parchment coffee which was in process of drying. Apart from activities to improve the entire drainage system of the cacao fields at Pln. "Look Out", the cacao industry in this division remained practically dormant during 1936.

Citrus and Ground Provisions.

28. Interest in the cultivation and propagation of budded citrus plants continued during the period under review. The earlier planted plants at Pln. Middlesex, Canal No. 2, are now four years old. This section of the orchard was well cared for throughout the year. Cultural methods of forking around the trees and mulching with rice straw during the dry weather, maintained the health and vigour of the cultivation.

21. Plants which were budded at Pln. Blankenburg in April, to establish a small orchard on the lighter soils of the estate, were ready for planting out towards the end of the year. This batch of 300 plants was budded chiefly with material of the Marsh Seedless grapefruit obtained from the Hosororo Experiment Station, North West District.

22. The Canals Polder area was, unfortunately, under water for several days towards the end of the year, occassioned by the heavy rains which fell in December. Owing to the flooded conditions, the cassava crop suffered much loss and the plantain cultivation to a minor extent. This is regrettable in view of the progress which was made during 1935–1936 to rehabilitate this provision centre after the floods of 1933–1934.

DISTRICT WORK.

Sugar.

23. The Agricultural Superintendent collaborated with the Sugar Experiment Station in connection with the sugar-cane experiments conducted in this division during 1936. The details of these experiments are given in the report of the Sugar Agronomist.

Rice.

24. The outstanding feature of the autumn padi crop was the establishment of a series of pure line padi seed-farms throughout the district, having for its object the improvement of the padi cultivation in the district. These farms were well organised this year. Issues of pure line Demerara Creole variety seed padi were made in the ratio to the size of the area cultivated by each farmer, so that at the end of harvest sufficient seed would be available for planting the next season's crop. This method relieves the farmer of becoming dependent on outside supplies of seed-padi of doubtful purity. In instances when the farmers' immediate requirements were met for planting the spring crop, what surplus remained was offered for sale to farmers who had not participated in the scheme. 45 bags of Demerara pure line seed (30 bags from Berbice and 15 bags from the Central Station) were distributed towards the establishment of these seed farms. In addition 40 bags of Demerara Creole obtained from Berbice were distributed to farmers.

25. These seed farms were carefully demarcated in order to prevent the general cultivation encroaching on the seed nurseries. The seed farms had the especial care of the owners and the direct supervision of the Agricultural Superintendent throughout the period of cultivation. The farmers' attention was focused on the necessity for producing pure line seed padi, and in this connection the plots were carefully rogued which kept the cultivation free of volunteer plants.

26. In the establishment of these seed farms the padi estates proprietors and the Assistant District Commissioner worked in collaboration with the Agricultural Superintendent towards the success of the scheme.

27. The Department's seed farm was established at Pln. Vreed-en-Hoop. This formed a central site of eleven acres. Ten acres for pure line padi seed production and one acre was under a variety trial. Five and a half acres of D114 variety seed padi were grown and four and a half acres of Demerara Creole. 124 bags of D114 and 96 bags of Demerara Creole were reaped for extension work in 1937.

28. The variety trial referred to above, which was conducted on one acre of the Department's seed farm during the autumn crop consisted of eight varieties including D114 which proved significantly better than the other varieties under the same trial. This fact was borne out by an extended trial of this variety by the proprietor of Pln. Vreed-en-Hoop, the yield obtained under this cultivation being slightly over 25 bags of 140 lb. per acre. The detailed results of this variety trial are given in the *Agricultural Journal of British Guiana* (Rice Number) for June, 1936, and in the March, 1937, issue of the same publication.

Citrus.

29. The cultivation of budded citrus plants made further progress during the year. In January, at Pln. DeKinderen an additional 600 sour orange seedlings were budded. The material was local buds collected from approved sweet orange trees growing on the East Bank, Demerara. Two consignments of budwood were also received from Trindad in May and November. These consisted of buds of Marsh Seedless grapefruit, and of Parson Brown, Valencia, Jaffa, Navel and Satsuma oranges. In addition to these importations buds were obtained from the Hosororo Station, N.W.D., and from other local trees of known quality. This nursery, during the course of the past two years, has produced excellent budded citrus plants.

30. In February, 25 budded orange plants of the "Haags Bosch" variety were planted out in the orchard at Pln. Leonora, West Coast. The following were received from Hosororo Experimental Station, North West District, during the year and planted at Endeavour, Canal No. 2:—

Marsh Grapefruit—50 plants; Oranges—19 plants; Pineapple, 9 St. Michael's Blood, 6 L.G. Gong, 4 Ruby, 1 Homassasa, 1 Pernambuco and 10 budded lime plants.

31. A new citrus nursery was started in August at Pln. Toevlugt, West Bank.

Rice Mills.

32. There were forty-two rice mills operating in the division in 1936. In April a careful and complete survey was made of them during which valuable information, bearing on milling factors, sanitary conditions and general equipment of the factories was obtained, and with similar information from other divisions formed the subject matter of Volume VII. No. 2 of 1936 of the Agricultural Journal of British Guiana.

AGRICULTURAL EDUCATION.

School Gardens.

33. In this division there are now two registered school gardens which receive grants from the Agricultural Department. In addition, there are three unaided gardens. These, however, received equal attention during the year espacially in regard to agricultural instructions and in the distribution of vegetable seeds and seedlings.

34. It was a difficult year for the progress of the gardens. Unfortunately, the seasons did not synchronise with the school terms to make these gardens the success as was attained during 1935. The school terms were marked either by too much rains or very dry weather which hampered the cultivation of garden crops; consequently, these gardens were unable to participate fully in the school gardens' competitions held in November.

Competitions.

Padi Competitions.—The outstanding feature of great importance of these competition to the rice industry was the propagation of pure line seed padi to supply seed requirements for cultivation in the following season. The competitions were therefore restricted to the private seed farms established during the autumn crop. Prior to the distribution of pure line seed obtained from the seed farms of the Department of Agriculture, meetings were held, and the object of the organization of these nurseries was explained. Lectures on the value of pure line padi seed production on the influence of the rice industry were given at several padi estates. These lectures were followed up by instructions in connection with the laying out of the seed farms. There were 68 entrants in the competitions. The competitors

did very good work during the period of cultivation to maintain the purity of the seed farms. The farms were judged in accordance with the following schedule:—

Farm—

(1) Preparation of the nursery ...	...	40 points
(2) Attention given to roguing Purity of padi ...	...	40 „
(3) Yield	...	20 „

Seed.—

(1) Quantity of seed reserved from the pure line seed farm	...	50 points
(2) Quality of seed stored ...	...	20 „
(3) Method of storage ...	...	15 „
(4) Immunity from weevils and padi moth ...	...	15 „

36. The following table gives the order of merit of the successful competitors :—

Name.	Address.	Farm.			Seed.				Total. %	Awards.
		Preparation of the Nursery.	Attention given to roguing–Purity of padi.	Yield.	Quantity of seed reserved.	Quality of seed stored.	Method of Storage.	Immunity from weevils and Padi Moth.		
		Points.	Points.	Points.	Points.	Points.	Points.	Points.		
Allijohn ...	La Jalousie ...	40	40	20	50	20	15	15	200	$ 15 00
Choee ...	Crane ...	40	40	20	45	20	15	15	195	10 00
Ramsamooj ...	Vreed-en-Hoop	40	40	20	40	20	15	15	190	5 00
Dudnath ...	Windsor Forest	40	40	20	38	20	15	15	188	3 00

In addition to the prizes awarded, 28 pure line seed certificates, signed by the Director of Agriculture and the Agricultural Superintendent were issued.

37. *Coffee Competitions.*—Coffee competitions were also organized in the Canals Polder centre for the best exhibits of Liberian Coffee of commercial standard of not less than 25 lb. There were 24 entrants in Canal No. 1 and 32 in Canal No. 2 It is gratifying to report that the competitors made commendable efforts in the preparation of the exhibits and showed marked enthusiasm throughout.

38. The competitions were designed to demonstrate the proper methods in the preparation of this commodity, and to revive interest in the coffee-growers to produce a better grade of coffee than is at present put on the market, despite the prevailing low price of cured coffee, as the better product may influence an upward tendency in price.

39. The following table gives the winners in the respective sections ;

Canal No. 1.

Shivnath Singh	...1st prize	$8.00
Mohabirsingh	...2nd „	4.00
Hiralall	...3rd „	2.00

In this section seven consolation prizes at $1.00 were also awarded.

Canal No. 2.

E. R. Samai	...1st prize	$8.00
Mohammed Latiff	...2nd „	4.00
Olie	...3rd „	2.00

In this section also eight consolation prizes at 50 cents were awarded.

CO-OPERATIVE CREDIT BANKS.

40. The Agricultural Superintendent was appointed to be Chairman of the Wakenaam Co-operative Credit Bank in November, as well as continuing the

Chairmanship of the six banks in the West Demerara Division. The business of these Banks was very active during the year under review. A vigorous policy was undertaken to recover overdue loans and to bring the borrowing members to the realization of their responsibilities in the co-operative working of these banks. It is pleasing to report that in this connection much has been achieved. At the close of the year fair progress was made in the collection of long outstanding loans and interest and in the revival of business.

ACKNOWLEDGMENTS.

41. It is my duty to place on record at the close of this report, my appreciation of the sincere co-operation rendered by the farmers generally and the padi estate proprietors who supported the pure line seed padi enterprise in the establishment of the seed farms and who also lent their assistance towards the progress of the agricultural welfare of the division during 1936.

A. A. ABRAHAM,
Agricultural Superintendent,
West Demerara.

March 3, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE ESSEQUIBO DIVISION FOR THE YEAR 1936.

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REPORT ON THE ESSEQUIBO DIVISION FOR THE YEAR 1936.

STAFF.

H. Macluskie U.D.A.	—Agricultural Superintendent.
E. G. Benson, B.Sc., C.D.A. A.I.C.T.A.	—Assistant Agricultural Superintendent.
E. M. Morgan	—Agricultural Instructor.
A. W. Sears	—Agricultural Instructor, Essequibo Islands.

1. The Assistant Superintendent was transferred to Berbice in April and was replaced by Mr. E. M. Morgan, Agricultural Instructor, who returned from vacation leave in July. The Agricultural Superintendent was transferred to Berbice to act for Mr. Gillespie who went on leave in November. The Assistant Agricultural Superintendent then returned to Essequibo in December and assumed charge of work on the coast, while Leguan and Wakenaam were placed in charge of the Agricultural Superintendent, West Demerara.

GENERAL.

2. The work of the Division consists of the administration of the Bush Lot Land Settlement; supervision of the Government estates which are leased; maintenance of Experiment Stations; Agricultural Education; Rice Grading; Chairmanship of Co-operative Credit Banks; Collection and Collation of Census Returns (Agricultural Crops) and district routine.

3. Two crops of rice were grown at the Department Stations at Henrietta, Wakenaam and Leguan.

4. Three Co-operative Credit Banks were supervised by the Agricultural Superintendent. On his departure the Agricultural Instructor became chairman of the coastal banks and the Agricultural Superintendent, West Demerara, became the Chairman of the Bank in Wakenaam.

5. Two school gardens aided by Departmental funds were in operation and several others were started at various points.

CROP CONDITIONS.

Rice.

6. The price of padi dropped during the year to one dollar per bag maximum price, and in some instances only 72 to 84 cents was paid.

7. Quality of seed was upheld and considerable interest was evinced by the proprietors in the Department's activities. The long grain Seeta Patna types are in increasing demand to meet the requirements of the Trinidad market and this, to a considerable extent, has tended to alter the Department's seed distribution programme.

8. "Bullmashing" or threshing by oxen continued and, provided that the operation is carried out on sanitary lines, the harm attributed to it is overrated.

9. Weather conditions for the small crop were not good, the quality of stocks was consequently adversely affected. Damp padi is one of the chief causes of discoloured rice.

10. The acreage under the crop was estimated as follows in the Autumn :—

Coast	...	...	6,229	
Wakenaam	...	...	2,708	
Leguan	...	...	1,991	10,928 acres.

11. Yields in the spring crop remain around 10 to 15 bags (140 lb.) per acre and in the autumn crop 18 to 20 bags. Yields show no improvement and will not do so until some system of resting the land is introduced. The ideal would seem to be the cultivation of one crop per annum, but that is not practicable owing to the lack of work for the people between crops.

12. There were no diseases or pests reported.

Coconuts.

13. The acreage under this crop shows no change and little improvement in the cultivation was noted. Plantations for the most part remain in an overgrown state owing to lack of capital for maintenance purposes.

14. Copra prices ranged around fifty-five dollars per ton during the year whilst nuts were worth from five to seven dollars per thousand. The grading of nuts is not practised.

15. Coconut oil makers were active, chiefly in Wakenaam. Two new mills were opened on the coast, where a local market for oil at 45 cents per gallon were readily found by one manufacturer. Pig keeping in conjunction with coconut oil making is not sufficiently exploited. This is perhaps due to the uncertainty of the market for high grade pigs.

16. Wilt was as usual prevalent but not rampant, and there was an indication of *Brassolis.*

Ground Provisions, Coffee and Fruit.

17. The Pomeroon area is the chief location for these products. The failure of the coffee market prices which dropped to 3 cents per lb., is responsible for much adversity in that area, coconuts are now being entertained as a more likely venture.

18. Provisions and fruit are liable to periods of glut and frequently poor prices are obtained. The only outlet of any consequence for these products as far as the coast is concerned is Georgetown. A small but more or less thriving provision area is to be seen in Leguan where truck crops are grown andshipped to Georgetown, the West Coast of Demerara, and up the river to Bartica for the Goldfields.

Milk.

19. Whilst this product does not come under the category of crops, it is, nevertheless, included owing to its importance. It is shipped daily to Georgetown from Leguan. Unfortunately, the Coast and Wakenaam are not placed so advantageously for shipping purposes, and the milk industry there is solely confined to local consumption and calf rearing.

DISTRICT WORK.

Rice.

20. *Seed Distribution*—Distribution of seed supplies throughout the district is achieved normally in two phases. First the Department grows supplies in central stations at Henrietta, and the Islands of Leguan and Wakenaam. Secondly, as the supply cannot meet the demand, proprietors are encouraged to obtain sufficient seed from their nearest central station, for a seed farm of their own from which to supply the requirements of their tenants. Unfortunately, because of the demands in the West Indian Market for long grained rice-type M.S.P.—seed distribution has suffered a set back owing to the fact that there was not sufficient long grained seed padi to meet the demand, and a fair stock of Blue Stick—the usual variety grown—was left on hand. The cultivators, however, do not profit from any change of variety unless the yield is higher than the one normally grown.

21. In the autumn crop of the current year, however, it was possible to prepare for a demand of long grained padi, and sufficient to establish seed farms on all coastal estates was grown.

22. The following table shows seed stored and distributed for the autumn crop :—

District.	No. of Bags (140 lb.) distributed.	
	Pure Line Seed Departmental Stocks.	Selected Seed Purchased.
Essequebo Coast	477	333
Wakenaam and Leguan ...	266	...

23. *Rice Grading*—Following the usual practice, rice shipments for export were examined from time to time at the factories in the district, on behalf of the Rice Grading Officer, Georgetown.

The table below shows the quantities :—

Super	14,168	
Extra No. 1	1,720	
No. 1	1,050	16,938 bags

Agricultural Education.

24. *School Gardens*—There are two aided gardens, one at Huis't Dieren and the other at Sans Souci, Wakenaam. Other voluntary efforts are also in evidence but these are handicapped through lack of funds.

25. *Competitions*—Five competitions were held in the district—three for padi farmers and two for farmers in the Pomeroon. The padi competitions were held on the Essequibo Coast, Wakenaam and Leguan.

An endeavour was made to encourage the extension of pure line padi by awarding points for roguing and for the subsequent care of padi reaped from the cultivation and stored for seed purposes. The results of the three padi competitions are as follows :—

(*a*) *Padi Competition, Essequibo Coast.*

1st Prize	...	($15)	Badrinauth, Huis't Dieren.
2nd „	...	($10)	J. C. Laurie, Better Hope.
3rd „	...	($ 5)	David, Columbia.
4th „	...	($ 3)	Sookram, Land-of-Plenty.

(*b*) *Padi Competition, Wakenaam Island.*

1st Prize	...	($15)	B. Rancharan.
2nd „	...	($10)	Ramlakhansingh.
3rd „	...	($ 5)	Abdul Kadir.
4th „	...	($ 3)	A. M. Henry.

(*c*) *Padi Competition, Leguan Island.*

1st Prize	...	($15)	Nan.
2nd „	...	($10)	Abdool Samad.
3rd „	...	($ 5)	Samaroo.
4th „	...	($ 3)	Beepat.

The Pomeroon competition was designed to improve the quality of coffee and sweet potatoes by awarding two prizes :—

(*a*) the best bag of 140 lb. of graded sweet potato.
(*b*) the best 5 lb. of coffee,

The results of the Sweet Potato competition are as follows :—

1st Prize	...	($8)	James Goddett, Burnt Bush, Pomeroon.
2nd „	...	($4)	Henry Goddett, Burnt Bush, Pomeroon.
3rd „	...	($2)	Stephen Campbell, St. Joseph, Pomeroon.
4th „	...	($1)	Dindehall, St. Joseph, Pomeroon.

No interest was taken in the coffee competition.

26. *Agricultural Extension.*—All officers have rendered advice where required on occasions too numerous to enumerate in this report.

57. *Demonstration Apiary.*—This was started during the year and should be of benefit to those interested in honey production.

Co-operative Credit.

28. *Credit Banks.*—There are three co-operative credit banks in the district. Two serve the coast and are in sound condition, paying dividends of three and six per cent. The third bank is on the island of Wakenaam and is confining activities mainly to the collection of outstanding loans.

29. *Emergency Agricultural Loans and Pomeroon Flood Relief Loans.*—

These loans were granted in 1933–34 to assist—

(*a*) Farmers on the coast to re-establish their rice lands, and
(*b*) Pomeroon coffee and provision farmers.

The Pomeroon loans are repayable in 1939 (5 ye ars) the interest being due annually and the emergency loans after the expiration of a year. During the current year a concession was granted to borrowers of the Pomeroon loans, which allows that, provided borrowers paid up all interest due by the end of the year, such payments would be treated as capital payments and credited in that manner. Where borrowers failed to pay up all interest due at the end of the year, interest would be charged in full, and the concession lapse.

The position of the loans at December 31, 1936, were as follows :—

	AMT. LENT.	LOAN REPAID.	INT. PAID.
Pomeroon Flood Relief Loans ...	$ 4,000 00	$ 224 75	$ 197 49
Emergency Agricultural Loans ...	2,710 00	1,863 51	318 43

ANNA REGINA ESTATES.

30. These embrace Anna Regina, Henrietta, Richmond and La Belle Alliance comprising about 2,000 acres of which 900 odd are rice lands. The estates are leased for three years to Mr. Ramparikhan Rai of Pln. L'Union whose lease was due to expire at the end of the current year but which has been renewed for 1937.

31. The upkeep of the channel has been fair. Two channels equipped with sluices provide drainage, and these were blocked at different periods by silt brought in by the sea.

32. The old factory building, two old boilers and the concrete foundations were sold under contract to the Honourable S. H. Seymour during this year.

33. Several inspections of the estates were made including the Tapacooma Lake from which the irrigation is water derived. Before harvest of the autumn crop a water shortage was threatening which, happily, was avoided by the early advent of the rains.

34. Repairs to the Anna Reg ina sluice were effected on behalf of the Drainage Board owing to the failure of the lessee to carry out the work.

BUSH LOT LAND SETTLEMENT.

35. The following tables summarises for Bush Lot Settlement, the population, area farmed, and total indebtedness of the settlers, for the first and second half year :—

Period.	Population.	Area Farmed acres.	House Rent.	Land Rent.	Sanitation charge.	Interest.	Advances.	Total.
January–June ...	214	124	$ 198 67	$ 538 09	$ 1 50	$ 82 36	$ 1,593 18	$ 2,413 80
July–December ...	214	230	71 27	312 06	11 25	82 69	1,572 62	2,049 89

36. Of the total sum under advances the sum of $514.66 was secured by obtaining notes and branding animals in the hands of the settlers. A total advance of $461.14 were made to settlers during 1936. Had the price of padi been greater, debt reduction would be considerable.

37. Following normal practice the settlers' crop was put up for tender. Hitherto the crop had been sold to a local firm, but this year the successful tenderer was a Georgetown merchant who offered $1.06 per bag of 155 lb. This figure allowed a payment to the settlers of one dollar, the remaining six cents being required for winnowing, handling and putting on board a punt, at the Anna Regina sluice. Even so the price credited to the settlers was higher than that generally paid for similar padi.

38. Two crops were grown during the year. The spring crop was marred by bad weather, and poor revenue collection as a consequence. The autumn crop was a good one, although bad weather was experienced at the commencement. The usual maintenance work was carried out such as repairs to houses, roads and bridges, sluices and weirs, etc.

EXPERIMENTAL STATIONS.

Henrietta.

39. *Experimental work.*—Henrietta Station is devoted to growing seed for distribution and experimentation. The total yield of the spring crop was 62 bags and the autumn crop 247 bags (140 lb.).

40. The work of single head selection and strain trials of Blue Stick continued in both crops but experiments were mainly conducted in the autumn crop and were as follows :—

No. of Seedlings per Hole.—Farmers generally use too much seed per acre, and the trial was designed to demonstrate this waste. The treatments were one, two, three, five and seven seedlings per hole. The results show that 1, 2 and 3 seedlings per hole gave significantly better yields.

41. *Strains of Blue Stick.*—Five selected strains of Blue Stick were tested against each other. There was no significant difference between them.

42. *Age of Transplanting.*—This is a repeat trial from last year when the three weeks old seedlings were the most successful. The treatments were, transplanting at 3, 4, 5, 6 weeks and double transplanting. The results show that significantly lower yields were obtained from 3 and 6 weeks old seedlings. Although the highest yield was obtained from double transplanting there was no significant difference between yields from seedlings which were double transplanted and seedlings transplanted at 4–5 weeks old. The conclusion is, therefore, that the more expensive double transplanting is not worth while and that seedlings should be transplanted at 4–5 weeks old.

43. *Variety Trials.*—Varieties of padi were tested as follows :—(*a*) *Standard trials* which were conducted all over the colony and at three points in the district namely, Henrietta, Affiance and Wakenaam. The varieties tested were Demerara Creole, No. 75 D 114, Blue Stick, No. 91, No. 79, Kalyaman and D 110.

44. The results at the three points are as follows :—

Henrietta.—Blue Stick and No. 79 with no significant difference between them are significantly better than any other variety.

Affiance.—No significant difference between varieties.

Wakenaam.—No. 79 and D 114 significantly better than any other variety except D 110; D.C. was the lowest yielder.

45. (*b*) *Two variety trials at Henrietta Experiment Station and at Wakenaam*—The Henrietta trial consisted of No. 116, 92, 97B, Blue Stick, 99, D 114, 79 and

D 115. At Wakenaam this trial was somewhat modified to include local strains of Blue Stick instead of some of the newer and lesser known varieties introduced in the Henrietta trial.

46. The results are as follows :—

Henrietta.—D 99 and No. 79 with no significant difference between them are better than any other variety.

Wakenaam.—D 114 and No. 79 with no significant difference between them are better than any other variety.

47. *One crop versus two crops :* Owing to the falling yields on the lands locally, which are always growing two crops per annum, it was decided to initiate a trial to denote differences between single and double cropping. For this purpose two acres were selected and during the year they have grown respectively a single and a double crop. The differences noted between these areas are not yet apparent.

Wakenaam.

48. This station is devoted to the production of seed supplies for farmers and the testing out of new varieties. In the spring crop 43 bags were grown and in the autumn 120 bags (140 lb.). Also in the autumn crop progeny rows and a variety trials, mentioned above were conducted. Instead of Blue Stick the autumn crop was devoted to D 114 which is a heavier yielder and a longer grained type simular to Carolina. The variety appeals to the farmers who have booked up the entire crop.

Leguan.

49. This station grows seed solely for distribution. In the spring crop 40 bags were produced and in the autumn 130 bags. This year Blue Stick was abandoned and D 115 which like D 114 is a Carolina type padi, was grown, with marked success.

Field Days.

50. A successful field day was held at the Henrietta Experiment Station when there was a good attendance of prominent proprietors and others who showed marked interest in the experiments in progress.

MISCELLANEOUS.

51. *Visitors.*—His Excellency the Governor accompanied by his A.D.C. and the Acting Director visited the coast and inspected the Department's activities in January. The Colonial Secretary made an inspection of the district accompanied by the Agricultural Superintendent in March. The Surgeon General visited the Settlement in connection with Public Health. The Director and Deputy Director and other Departmental Officers visited the district at various times. Other visitors to the Settlement and Experiment Station included many local residents and estate proprietors. Such visits are always welcomed.

52. *Reports and Correspondence.*—The following reports were submitted :—

Report on the Re-Organisation of the Onderneeming Reformatory Farm ; Monthly aad Quarterly Reports (progress) ; Emergency and Flood Relief Loans ; Settlers' Indebtedness and its collection ; 364 items of correspondence were despatched and 437 received.

53. *Acknowledgments.*—It is a pleasure to record my appreciation of the loyal support always accorded me by the Staff.

HECTOR MACLUSKIE,
Agricultural Superintendent,
Essequibo.

March 15, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE NORTH WEST DISTRICT FOR THE YEAR 1936.

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REPORT ON THE NORTH WEST DIVISION FOR THE YEAR 1936.

STAFF.

L. E. McKinnon—Agricultural Instructor.

GENERAL.

During the year weather conditions were favourable for all crops, especially citrus. The total rainfall for the year was 102.47 inches.

2. The majority of the farmers again suffered from the low prices obtaining for their produce. The estates of Messrs. Garnett & Co. ceased operations during the year, causing the depression to be felt all the more by the small farmers who were employed there for part-time work. All the farms on the pegasse lands in the Kaituma have been abandoned and the Imbotero which was once a flourishing district has now only a few farms. The older coffee farms in the lower Aruka are all in a semi-abandoned state and will be given up in the near future, if the present conditions continue.

3. The Agricultural Instructor travelled to Georgetown on April 30, and visited Head Office during his stay in Georgetown. Visits were paid to the farmers agents in the Stabroek Market to discuss the position of the farmers and the prices obtaining for ground provisions.

4. A soil survey was carried out on the high lands of the Kaituma-Arakaka trail to investigate their possibilities for agricultural purposes. Owing to their position and situation, they were not considered suitable. Soil samples were taken and forwarded to the Chemist-Ecologist for examination.

5. Visits were paid to all the farms, including those in the outlying districts, the total mileage travelled by boat being 3,480.

6. Farmers and others in the district are becoming interested in the citrus orchard at Hosororo.

CROP CONDITIONS.

Coffee.

7. This crop has again suffered considerably during the year, and will continue to do so, owing to the low price for cured coffee. The acreage under coffee is 1,615 acres—a decrease of 384¼ acres since the previous year. Should no attention be paid to Messrs. Garnett & Co.'s coffee estates during the next year, they will go out of cultivation altogether and the next census will show a further considerable reduction in the area under this crop. There are still a few farmers who have not yet taken advice and reduced their coffee farms to a manageable size, being content to pick a little here and there, at no profit to themselves.

Coconuts.

8. In some districts the palms planted by the farmers are gradually dying out despite which they continue to replace them. One farmer in the Mora passage has recently put in 10 acres and in this district the crop is being planted extensively; the cultivation is in fairly good condition.

Citrus.

9. The area under citrus has increased by 7 acres, and the budded plants supplied to farmers, with a few exceptions, continue to make good progress and some of the trees have borne a few fruits. The Wanaina cultivation was well maintained during the year and a very good crop obtained.

10. *Limes.*—The lime cultivation at Mabaruma has made very good progress especially those trees planted on pegasse, and the crop was a very large one. All

the limes from the district were bought by the proprietor of the Mabaruma lime factory. The output of raw lime juice was 25,000 gallons and that of oil of limes, 120 gallons. The labour supply for this work was better this year than previously, owing to the closing down of Messrs. Garnett & Co.'s coffee estates.

Cacao.

11. This cultivation is showing some promise, and farmers who have suitable hill lands continue to extend. Small areas are also being planted on pegasse soils. The acreage in cacao is 158½ acres—an increase of 9¼ acres.

Ginger.

12. This crop is on the increase. During the year there was some demand for green ginger and the prices paid by the agents were considered fair, so that the farmers who have small plots are gradually extending them.

Ground Provisions.

13. During the year farmers made efforts to extend the area under ground provisions and new lands as well as old were taken up, but the price of provisions became so unremunerative that some of the farmers abandoned their fields; the price for tannias during April and May dropped as low as 72 cents to 84 cents per bag of 140 lb.

14. The seven varieties of yams which were on trial on pegasse lands were reaped. Six varieties, viz.: Chinese, Guinea, Horn, Ebu, Ordinary Lisbon and Bottleneck Lisbon, showed promise, and these were extended, but the rains that fell shortly after they were planted waterlogged the land and hampered their growth, so that the plants were not very promising at the end of the year.

Maize.

15. The area under corn was extended, abandoned lands and those with very old coffee trees being cleared and planted as a result of a contract secured with a Georgetown firm.

HOSORORO EXPERIMENT STATION.

General.

16. The Station was well maintained during the year. The Citrus Orchard continues to prove of interest to farmers. His Excellency the Governor, Sir Geoffry Northcote, K.C.M.G., accompanied by the Inspector General of Police and the District Commissioner visited the station on January 9 and inspected the Citrus and Haiari cultivations. Other visitors to the station included the Government Botanist and a large number of farmers.

Citrus.

17. The area under budded citrus was well maintained. The grapefruit and orange plants of the earlier plantings have made satisfactory progress and have borne a very good crop—208 grapefruit and 73 orange plants fruiting during the year. The fruit was of good flavour and the majority was sold in Georgetown. A trial shipment of grapefruit was sent during the year to England.

18. Twelve grapefruit trees were selected during the month of May for manurial treatment, six healthy trees and six unhealthy ones. The healthy trees were given an application of 3lb. superphosphate per tree and the unhealthy trees 7lb. limestone and 4lb. basic slag per tree. Pen manure was also applied to a few chlorotic trees, with good results.

19. *Budded and seedling limes.*—The experimental area of 2½ acres of budded and 2½ acres seedling limes continues to make good progress and has now become self-supporting. Two weedings were carried out during the year and the yields obtained amounted to 216 barrels.

Other Fruit.

20. The area under budded and grafted pears was well maintained and the trees produced a very good crop. There were two outstanding varieties—Pollock and Rudder—which produced fruits of very good flavour.

Miscellaneous.

21. *Fish Poison Plants.*—No cultural work was carried out during the year, as the plants continued to maintain themselves satisfactorily. Samples of roots and stems have been sent during the year to the Chemist-Ecologist for analysis. Stem cuttings were also sent to the Government Botanist for distribution.

22. *Black Pepper (Piper nigrum).*—The plants growing on the new site have made good progress, and those on the old site will be abandoned.

23. *Chaulmoogra oil (Hydnocarpus anthelminta).*—The plants growing on the new site have similarly made good progress, and the old plants will therefore be abandoned.

24. *Historical Cacao* (from Berbice).—The majority of these plants are fruiting and the pods are being distributed to farmers for seed.

25. *Tung oil.*—The three plants of *Aleurites fordii* have failed to make any progress, but the plants of *A. montana* are promising, there being ten of them in all

26. *Calapogonium mucunoides* has been extended to other sections of the citrus orchard and continues to prove a very good cover crop.

27. *Ginger.*—The Canton and Jamaica ginger have been extended and they are making satisfactory growth.

28. *Oil Palms.*—Attention is being paid to these plants; they have reached a height at which they can almost take care of themselves.

29. *Citronella.*—The citronella grass continues to flourish and samples were forwarded during the year to the Chemist for analysis.

30. *Cherimoya.*— The plants which were set out near the citrus orchard proved a failure. Three plants have survived and they were transplanted to the hill foot on pegasse soil.

31. *Panama Hat Palm.*—The Palms growing at the foot of the hill are thriving

WAUNA SUB-STATION.

General.

32. Only the citrus cultivation received attention during the year. The coconuts have made very little progress. The oil palms have made very good growth, although no weeding was carried out on this plot.

Citrus.

33. The grapefruit and orange plants have made some progress during the year. The Parson Brown variety bore a very good crop. The budded limes also made very good growth and bore well. Twelve grapefruit and twenty orange plants fruited during the year.

Haiari.

34. The white and black haiaris in the open continue to spread and have now become a tangled mass of bush. Samples were collected during the year and forwarded to the Chemist for analysis.

PESTS AND DISEASES.

35. *Sclerotium coffeicolum* Stahel.—This disease was again prevalent on all the farms in the district during the year but, owing to the prevailing conditions, no effort was made by the farmers to control it.

36. *Hard-back beetles (Cockles).*—These made their appearance with the June rains and did much damage to the ground provisions.

37. *Coushi ants.*—This pest proved very troublesome during the year; assistance was again rendered by supplying small quantities of carbon bisulphide from the station to certain farmers.

COMPETITIONS

38. A coffee competition was held during December. The district was divided into two areas, viz.: Barima and Aruka-Koriabo. Prizes were awarded for the best exhibit of Liberian coffee of commercial standard, of not less than 25 pounds. Eight exhibits were received from the Barima district and five from the Aruka-Koriabo district. The exhibits received were of very high standard.

39. The following awards were made :—

Barima District—			
1st Prize	C. Poon	...	$ 8 00
2nd „	J. Jerome	...	4 00
3rd „ (divided)	Veeramah	...	1 00
	Madramootoo	...	1 00
Aruka-Koriabo District—			
1st Prize	E. Chan-a-Sue	...	$ 8 00
2nd „	J. Vansluytman	...	4 00
3rd „	R. Walker	...	2 00

DISTRIBUTION OF SEEDS AND PLANTS.

40. The following were sent to the Botanic Gardens during the year :—

Budwood—Grapefruit (Marsh)	...	1,600 buds.
„ Orange (several vars.)	...	750 „
Sour Orange seeds	...	23,700
Lime seeds	...	4 oz.
Sour oranges for seed purposes	...	3 bags.

In addition, 158 cacao pods were distributed in the district.

L. E. McKINNON,
Agricultural Instructor,
North West District.

February 11, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE SUGAR EXPERIMENT STATIONS FOR THE YEAR 1936.

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REPORT ON THE SUGAR EXPERIMENT STATIONS FOR THE YEAR 1936.

GENERAL.

Staff.

C. H. B. Williams, M.A., A.I.C.T.A., Dip. Agr.	—Sugar Agronomist.
C. Cameron	—Field Manager.
L. A. Forte	—Field Assistant.
B. A. MacArthur	—Field Assistant.
St. G. C. Cooper, Dip. Agr.	—Field Assistant.
L. A. Robinson (seconded)	—Laboratory Assistant.
H. B. Singh	—Laboratory Assistant.
J. B. Bourne	—Statistical Clerk.

Mr. Cooper resigned his post and left the Colony on August 2 to take up an appointment with the Agricultural Department of Grenada, B.W.I.

2. Mr. L. A. Forte was seconded for work in the Economics Division of the Department of Agriculture, in connection with a survey of cane farming on the East Coast of Demerara, from January 2 to February 13.

3. Various members of the Staff were absent from duty as follows:—

Mr. Williams, August 2 to September 10 (Sick and Casual Leave);
Mr. Cameron, February 25 to March 3 (Sick Leave);
Mr. Singh, April 15 to April 30 (Study Leave) and July 1 to July 7 (Sick Leave);
Mr. Forte, April 25 to May 24; July 21 to July 26; September 1 to 6 (Sick Leave);
Mr. Bourne, February 4 to 8 (Sick Leave).

4. Mr. Singh sat and passed the first examination of the Diploma in Sugar Technology of the City and Guilds Institute, London.

Committee.

5. The following members formed the Sugar Experiment Stations' Committee for the year:

The Director of Agriculture	—Chairman.
Mr. J. C. Gibson	—Pln. Port Mourant.
Hon. M. B. G. Austin	—Messrs. Curtis, Campbell & Co., Ltd.
Mr. A. Murison	—Pln. Uitvlugt.
Mr. J. Bee	—Pln. Albion.
Mr. R. E. Rhodes	—Pln. Diamond.
Mr. G. M. Eccles	—Pln. Blairmont.
Mr. C. L. C. Bourne	—Secretary to the Committee.

6. Mr. H. F. Chapman of Pln. Bath, acted for Mr. Eccles during the latter's absence from the Colony.

Finance.

7. The sum of $19,595.00 was voted from the funds of the Sugar Experiment Stations' Committee for the working of the Station during the year. A total of $19,803.48 (including $202.37 for Moth-Borer Research) was spent. Receipts from Assessments for the year amounted to $18,373.50; those from Sale of Canes to $4,171.51 and Miscellaneous Receipts to $283.49. Included in the amount recorded for Sale of Canes is the sum of $792.76 paid early in the year for canes delivered

towards the end of 1935. A total of $3,599.92 was spent from a grant of $3,600.00 made from the Colonial Development Fund, and a total of $1,922.40 was spent from the joint contribution of Messrs. Booker Bros. McConnell & Co., Ltd. and Messrs. Imperial Chemical Industries.

Equipment.

8. The watch house at the Southeast corner of the Sophia Station was destroyed by fire, presumably of incendiary origin, on the early morning of November 29th. The loss was covered by insurance. A new watch house has been erected in its place.

9. By adapting a dynamo to the engine which drives the mills, electric light is now provided for the mill room and laboratory.

10. A small koker was erected between the pump-basin and the sideline at Field 1 West.

11. The old bridge across the middlewalk at Field 17, having got beyond repair, has been replaced by a new one.

12. A new boat was built for transporting cuttings, etc., the watch house in the Office compound repainted and other buildings and equipment overhauled and maintained in order.

CANE BREEDING AND INTRODUCTION.

13. The number of Demerara seedlings in field experiments and those undergoing further multiplication and selection are listed, under their year of production, in Table I.

TABLE I.

DEMERARA SEEDLINGS IN TESTS AND UNDERGOING MULTIPLICATION, ETC., DECEMBER, 1936.

Year.	Number of Seedlings.	
	In Tests.	Under Multiplication, Etc.
1913	1	...
1917	2	...
1918	...	...
1920	2	...
1921	2	...
1922	2	1
1923	1	...
1924	1	...
1927	2	...
1928	3	...
1929	5	...
1930	28	...
1931	2	2
1932	2	9
1933	25	25
1934	...	52
1935	...	15,405
Total ...	78	15,494

14. It will be seen that most of the older canes have now been eliminated from the tests, enabling attention to be concentrated on the more promising productions of recent years.

15. Attention has been drawn before to the surprising deterioration which seedlings may show at the second selection (grown from cuttings) as compared with their performance at the first selection, *i.e.*, in the first clump grown directly from seed. Since some of the very best of the first selections fail to come even to minimum standard at the second selection, the question arises whether the reverse phenomenon may not take place and seedlings which are uninteresting at the first selection become of value when grown from cuttings, *i.e.*, is one likely to discard a potential winner when rejecting all the weaklings at the "grown-from-seed" stage? In order to throw some light on this point it was decided to extend three

groups from the 18,132 seedlings of the 1934 group transplanted to the field in 1935, viz :

(*a*) 97 which surpassed a definite standard as regards weight per stool and total solids in juice ;

(*b*) 16 which attracted attention by their appearance but did not reach the standard set for group (*a*) ;

(*c*) 59 chosen at random, irrespective of appearance, after (*a*) and (*b*) had been selected.

16. These seedlings have recently undergone their second selection and it is of interest to record that, judged by a standard obtained from P.O.J. 2878 growing under identical conditions, none of group (*c*) was deemed worthy of further consideration. The following Table summarises the position in regard to the seedlings selected from the 1933 and 1934 batches.

TABLE II.

SELECTIONS FROM THE 1933 AND 1934 SEEDLINGS.

Year.	Number of Seedlings transplanted to field.	Percentage Selected.							
		First Selection.				Second Selection.			
		In group (a)	In group (b)	In group (c)	In all groups.	In group (a)	In group (b)	In group (c)	In all groups.
1933 ...	15,175	...	...	...	3.70	...	...	...	0 40
1934 ...	18,132	0.53	0.09	0.33	0.95	0.12	0.017	0.00	0.14

17. The introduction of the Zeiss refractometer has given greater precision to the selections which were even more rigid among the 1934 than among the 1933 seedlings. With the more rigid standard of selection it will be possible to grow a larger population than at present and it is planned, from next season, materially to increase the number of seedlings raised.

18. Table III shows the parentage, etc., of the 1934 seedlings which were chosen at the first and second selections.

TABLE III.

COMPARISON OF DATA FROM FIRST (SEEDLING) AND SECOND (CUTTING) SELECTIONS OF THE 1934 SEEDLINGS.

Parents. Female		Male		No. of Seedlings Planted in Field.	Selections.				Mean Total Solids in Juice.		Mean Weight in lbs.		Mean Stalks per Stool 1st Selection.
					1st.		2nd.		Selections.		Per Stool 1st Selection.	Per Row-ft. 2nd Selection.	
					No.	%	No.	%	1st.	2nd.			
Bourbon	x	Diamond 10 ...	A	15	...	...	...	...	...	...	...	...	...
			B		1	6.7	...	...	19.2	...	23.2	...	7
Co. 281	x	Diamond 10 ...	A	13	...	...	...	...	...	...	...	...	...
			B		1	7·7	...	...	19.0	...	21.2	...	15
P.O.J. 2725	x	Co. 281 ...	A	33	2	6.1	...	...	16.1	...	37.5	...	16
			B		...	...	...	...	...	...	...	...	...
P.O.J. 2753	x	Co. 281 ...	A	5	1	20.0	...	...	18.5	...	25.2	...	20
			B		...	...	...	...	...	...	...	...	...
P.O.J. 2878	x	Sorghum ...	A	15	2	13 3	1	0.7	20 4	18.8	54.7	13.8	13
			B		...	...	...	...	...	...	...	...	...
P.O.J. 2878	x	D. 625 ...	A	30	2	6·7	...	...	18.7	...	36.2	...	14
			B		2	6.7	...	...	18 9	...	17.0	...	6
S.C. 12/4	x	Diamond 10 ...	A	825	4	0·5	...	...	20.0	...	36.4	...	11
			B		1	0.1	...	...	16 5	...	8.7	...	5

TABLE III.—(CONTINUED).

COMPARISON OF DATA FROM FIRST (SEEDLING) AND SECOND (CUTTING) SELECTIONS OF THE 1934 SEEDLINGS—(CONTINUED).

Parents. Female		Male.		No. of Seedlings Planted in Field.	Selection. 1st. No.	1st. %	2nd. No.	2nd. %	Mean Total Solids in Juice. Selections. 1st.	Selections. 2nd.	Mean Weight in lbs. Per Stool 1st Selection.	Per Row-ft. 2nd Selection.	Mean Stalks per Stool 1st Selection.
T. 1198	x	Diamond 10 ...	A	790	4	0·5	1	0.1	19.8	18.8	49.7	12.5	16
			B		...	...	...	...	...	...	...	...	...
D. 118/02	x	Diamond 10 ...	A	30	1	3.3	1	3.3	17.3	19.2	48.0	13·9	12
			B		...	...	...	...	...	...	...	...	...
D. 814/12	x	Diamond 10 ...	A	240	2	0.8	...	...	19.8	...	24.7	...	7
			B		...	...	...	...	...	...	...	...	...
D. 666/18	x	Diamond 10 ...	A	450	3	0.7	...	...	17.5	...	32.9	...	6
			B		...	..	...	...	...	...	...	...	...
D. 516/20	x	Diamond 10 ...	A	360	1	0.3	...	...	22.0	...	25.2	...	5
			B		1	0.3	...	...	19.5	...	21.7	...	10
D. 557/20	x	Diamond 10 ...	A	195	2	1.0	...	...	20.2	...	42.0	...	12
			B		...	...	...	...	...	...	...	...	...
D. 927/22	x	Diamond 10 ...	A	150	1	0.7	...	...	19.1	...	49.5	...	15
			B		...	...	...	...	...	...	...	...	..
D. 53/27	x	Diamond 10 ...	A	330	...	...	...	...	...	...	...	...	...
			B		1	0.3	...	...	19.0	...	21.0	...	5
D. 1/28	x	Diamond 10 ...	A	2,265	6	0.3	5	0.2	18.5	19·2	46.3	13.1	13
			B		..	..	...	..	...	...	...	...	...
D. 11/28	x	Diamond 10 ...	A	405	4	1.0	4	1.0	20.9	19.9	23.6	15.4	7
			B		5	1.2	3	0.7	19.1	18.8	17.7	13.3	5
D. 7/30	x	Diamond 10 ...	A	660	1	0.2	...	...	22.5	...	48.0	...	10
			B		...	..	...	...	...	...	...	...	...
D. 13/30	x	Diamond 10 ...	A	890	8	0·9	1	0.1	20.2	18.1	30.9	7.3	9
			B		1	0.1	...	...	20.2	...	22.0	...	6
D. 51/30	x	Diamond 10 ...	A	240	7	2.9	...	...	20.9	...	35.9	...	10
			B		1	0.4	...	...	19.0	...	20.7	...	5
D. 66/30	x	Diamond 10 ...	A	2,893	15	0.5	2	0.1	19.6	19.2	44.7	12.6	14
			B		...	...	...	...	...	...	...	...	...
D. 78/30	x	Diamond 10 ...	A	360	2	0.6	2	0.6	17.2	17.6	38.9	14.5	14
			B		...	...	...	...	...	...	...	...	...
D. 80/30	x	Diamond 10 ...	A	345	...	...	...	...	...	...	...	...	...
			B		1	0.3	...	...	17.4	....	25.7	...	8
D. 81/30	x	Diamond 10 ...	A	1,335	9	0.7	2	0.1	19.4	18.5	37.3	13.6	11
			B		1	0.1	...	...	20.5	...	20.0	...	7
D. 88/30	x	Diamond 10 ...	A	150	6	4.0	2	1.3	19.3	19·3	38.6	14.2	9
			B		...	..	...	...	...	...	...	...	...
D. 135/30	x	Diamond 10 ...	A	510	2	0.4	...	...	19.0	...	50.2	...	13
			B		...	...	...	...	...	...	...	...	...
D. 178/30	x	Diamond 10 ...	A	1,311	6	0.5	...	...	19.2	...	54.0	...	13
			B		...	...	...	...	...	...	...	...	...
D. 182/30	x	Diamond 10 ...	A	645	6	0.9	1	0.2	19.6	18.9	37.8	7.1	10
			B		...	...	...	...	...	...	...	...	...

19. Below is a list of the other crosses attempted in 1934, but which failed to yield any promising seedlings. (For number of seedlings secured from each cross etc., see *Divisional Reports 1935*, Table III, p. 62).

Armstrong	x Diamond 10	P.O.J. 2878	x D. 66/30
Ba. 6835	x „	S.W. 3	x Diamond 10
B.H. 10/12	x „	D. 663/13	x „
B. 1529	x „	D. 351/20	x „
Co. 213	x „	D. 424 21	x „
D. 625	x D. 66/30	D. 438/21	(Self)
F.C. 916	x Diamond 10	D. 573/22	x Diamond 10
G. 119	x „	D. 602/22	x „
I.C.T.A. 36	x „	D. 134/27	x „
Meligeli	x „	D. 50/28	x „
M.P.R. 42	x „	D. 63/30	x „
M.P.R. 49	x „	D. 66/30	x D. 625
M.P.R. 145	x „	D. 73/30	x Co. 281
M.P.R. 151	x „	D. 73/30	x Diamond 10
P.R. 803	x „	D. 88/30	x D. 66/30
P.R. 826	x „	D. 710/33	x Diamond 10
P.O.J. 2714	x „	D. 711/33	x „
P.O.J. 2725	x „	D. 712/33	x „
P.O.J. 2725	x Sorghum	D. 712/33	x D. 66/30
P.O.J. 2753	x „	D 713/33	x Diamond 10
P.O.J. 2753	x Diamond 10	D. 714/33	x „
P.O.J. 2878	x „	D. 715/33	x „

20. Of the 19,898 seedlings of the 1935 group basketed (see *Divisional Reports of the Department of Agriculture, 1935*, pp. 63 and 64) 12,503 were transplanted to frontland soil at Sophia and 2,902 to pegasse soil at Pln. Uitvlugt. No selection has, as yet, been carried out on this group.

21. A large number of crosses was made in 1936. Of the seedlings obtained, 17,784 have been basketed in frontland soil and 5,401 in pegasse soil kindly supplied by Pln. Diamond. Further details concerning this group will be given in a later report.

22. Besides the canes listed in Table I, a considerable number of introduced canes are being multiplied and tested. In addition to these, the following were received on March 28 from the Central Quarantine Station, Trinidad ;—

B. 3127, B. 3125, New Guinea 24, B. 2977, B. 3179,
B. 3234, B. 3439 and S.P. Gehra Bon M.P. 618.

EXPERIMENTATION.

Experiments Reaped.

23. *Variety Trials.*—Of the 46 variety trials reaped during the year, 20 were fully reported on in *Sugar Bulletin* No. 5. The remainder will be considered in detail in a later Sugar Bulletin. Further trials with P.O.J. 2878 and Diamond 10 have confirmed early promise and it is now certain that they will outyield D. 625 not only as plant canes, but also as first and second ratoons. With the accumulation of more data for P.O.J. 2878, this variety is tending to forge ahead of Diamond 10 by a slight margin. Co. 213 has done well in the tests and certain estates have made preliminary commercial extensions. Extensions have also been made of D. 11/28, D. 49/30 and D. 66/30. D. 9/28 shows considerable promise as a ratooner. Several of the 1930 seedlings have outyielded P.O.J. 2878 and Diamond 10 as plant canes in more than one experiment and ratoon data from these are now awaited with great interest.

24. *Manurial Trials.*—Thirteen out of the 23 manurial trials reaped during the year have been dealt with in *Sugar Bulletin* No. 5. Another Bulletin, to be published about July, will contain the results of the remainder. It has now been established that second ratoons of D. 625, growing on flood-fallowed frontland,

should receive 4 cwt. of sulphate of ammonia per acre. It has also been established for P.O.J. 2878, growing on flood-fallowed frontland, that plant canes should receive 2 cwt. per acre of sulphate of ammonia, first ratoons 4 cwt. per acre, and second ratoons 4 cwt. per acre. In the case of Diamond 10, growing on the same soil type, first and second ratoons should both receive 4 cwt. of sulphate of ammonia per acre.

25. *Flood-fallowing Trials.*—Two of these were reaped during the year, one as a first ratoon and the other as a second ratoon. The former has been fully discussed in *Sugar Bulletin* No. 5. In the latter, the treatments had no statistically significant effect on yield of cane, sucrose content, juice purity or glucose ratio, but there was a suggestion that, so far as the second ratoon crop is concerned, the most beneficial of the treatments tried was deep flooding (12 ins.) for six months. Considering the total yield for three crops, however, deep (12 ins.) flooding with molasses (five tons per acre) added to the flood water, appears to be the most satisfactory of the alternatives tested. Fuller consideration of this experiment will be given in *Sugar Bulletin* No. 6.

26. Several other lines of investigation have been started or continued and a great deal of valuable information is accumulating. Some of this will be available for release in 1937 when it is hoped to publish the results of Mr. Cooper's studies on Cane Growth and Messrs. Cameron and Singh's work on methods of sampling with the Zeiss refractometer.

Experiments in Progress.

27. During the year, 43 variety, 12 manurial, 4 irrigation-manurial and 1 flood-fallowing trials have been started. Table IV lists the various experiments in progress, location, layout, etc. They totalled, at the end of the year, 75 variety, 31 manurial, 4 irrigation-manurial and 2 flood-fallowing trials. In addition nine tests of a preliminary nature, concerned with time of manuring, methods of interculture etc., are in progress at Sophia.

TABLE IV.

LIST OF EXPERIMENTS IN PROGRESS ON DECEMBER 31, 1936.

Estate.	Field.	Kind of Experiment.	Treatments.	Replicates.	Age of Cycle.	Date Started or Reaped.		Layout.
BERBICE—								
Skeldon ...	119-123 80	Irrigation-Manurial ...	6	4	Plants ...	29. 2.36		Ran. Bks.
,, ...	7 E.M.	Manurial ...	4	4	3rd Rat. ...	23. 9.36	3	Lat. Sqrs.
,, ...	8 E.M.	,, ...	4	4	,, ...	22. 9.36	3	,,
,, ...	8 Sp.	,, ...	4	4	2nd Rat. ...	24. 9.36	3	,,
,, ..	111/79	,, ...	9	3	Plants ...	27. 7.36		Complex.
Port Mourant ...	2-4 P.M.T.	Irrigation-Manurial ...	6	4	,, ...	10.12.35		Ran. Bks.
,, ...	11 T.L.	Variety ...	7	6	2nd Rat. ...	26.11.36		,,
,, ..	15 A.O.L.	,, ...	8	6	Plants ...	22. 9.36		,,
,, ...	7 A.W. (a)	,, ...	4	4	,, ...	12. 8.36		Lat. Sq.
,, ...	7 A.W. (b)	,, ...	4	4	,, ...	12. 8.36		,,
,, ...	13 R.	Manurial ...	5	5	2nd Rat. ...	27. 2.36		,,
,, ...	23 R.	,, ...	9	3	Plants ...	13. 8.36		Complex.
,, ...	28 T.L.	Flood-Fallow ...	4	4	2nd Rat. ...	27. 2.36		Lat. Sq.
Albion ...	31 K.	Manurial ...	5	5	,, ...	17. 9.36		,,
Rose Hall ...	20 T.	,, ...	5	5	,, ...	26. 2.36		,,
,, ...	30 R.H.	,, ...	4	4	3rd Rat. ...	25. 2.36		,,
,, ...	81 R.H.	,, ...	9	3	Plants ...	11. 1.36		Complex.
,, ...	6, 8 & 10 T.	Irrigation-Manurial ...	6	4	,, ...	4. 7.36		Ran. Bks.
Providence ...	14 E.W.	Variety ...	5	5	1st Rat. ...	23. 9.36		Lat. Sq.
Blairmont ...	26 Rp.	Manurial ...	9	3	,, ...	25.11.36		Complex.
,, ...	71 B.L.	,, ...	5	5	2nd Rat. ...	7.10.36		Lat. Sq.
,, ...	24 Rp.	Variety ...	4	6	,, ...	24.11.36		Ran. Bks.
Bath ...	21, 20 & 19,D.	Irrigation-Manurial ...	6	4	Plants ...	17. 7.36		,,
EAST DEMERARA—								
Cane Grove ...	53 M.	Manurial ...	5	5	2nd Rat. ...	9. 4.36		Lat. Sq.
,, ...	63 M.	,, ...	5	5	,, ...	2. 4.36		,,
,, ...	50 S.M. (a)	Variety ...	5	5	Plants ...	19. 3.36		,,
,, ...	50 S.M. (b)	,, ...	5	5	,, ...	19. 3.36		,,
,, ...	17 P.	,, ..	2	7	1st Rat. ...	8. 4.36		Ran. Bks.
,, ...	36 S.D.	Manurial ...	6	6	Plants ...	21.11.36		Lat. Sq.
,, ...	4 P.	,, ...	9	3	,, ...	26. 9.36		Complex.
Enmore ...	8 B.A.	,, ...	4	4	3rd Rat. ...	3 3.36		Lat. Sq.
,, ..	13 H. (a)	Variety ...	5	5	Plants ...	24. 4.36		,,
,, ...	13 H. (b)	,, ...	5	5	,, ...	24. 4.36		,,
,, ...	15 R.A.	,, ...	4	7	1st Rat ...	16. 4.36		Ran. Bks.
,, ...	16 E.P.	Manurial ...	5	5	2nd Rat. ...	8. 9.36		Lat. Sq.

TABLE IV.—(CONTINUED).

LIST OF EXPERIMENTS IN PROGRESS—(CONTINUED).

Estate.	Field.	Kind of Experiment.	Treatments.	Replicates.	Age of Cycle.	Date Started or Reaped.	Layout.
EAST DEMERARA--(Con.)							
Lusignan	2 G.H.W.	Variety	10	5	Plants	29.10.36	Ran. Bks.
,,	85 M.R.	Manurial	4	4	3rd Rat.	31. 3 36	Lat. Sq.
,,	76 A.	Variety	6	7	1st Rat	28. 8.36	Ran. Bks.
,,	40 W.	,,	3	7	,,	18. 2.36	,,
,,	H.	Flood-fallow	4	4	Plants	30. 5.36	Lat. Sq.
,,	4 E.	Manurial	5	5	3rd Rat.	20. 2.36	,,
,,	26 W.	,,	4	4	,,	3. 9 36	3 Lat. Sqrs.
La Bonne Intention	36 L.R.	Variety	3	7	1st Rat.	15. 4.36	Ran. Bks.
,,	45 M.R.	,,	5	7	,,	2. 9.36	,,
,,	22 C.M.	,,	4	6	3rd Rat.	3.11.36	,,
,,	14 M.W.	Manurial	5	5	2nd Rat.	26. 9.36	Lat. Sq.
Ogle	45 O.	,,	4	4	,,	6.10.36	3 Lat. Sqrs.
,,	45 O.	,,	5	5	,,	7.10.36	,,
,,	109 E.	Variety	7	7	1st Rat.	1.10.36	,,
Sophia	2 W. (a)	,,	5	5	Plants	26. 6.36	,,
,,	2 W. (b)	,,	4	4	,,	26 6.36	,,
,,	2 W. (c)	,,	3	4	,,	26. 6.36	Ran. Bks.
,,	2 W. (d)	,,	4	4	,,	26. 6.36	Lat. Sq.
,,	3 W.	,,	10	8	1st Rat.	21. 9.36	Ran. Bks.
,,	4 W. (a)	,,	5	5	Plants	8. 8.36	Lat. Sq,
,,	4 W. (b)	,,	5	5	,,	8. 8.36	,,
,,	4 W. (c)	,,	5	5	,,	8. 8.36	,,
,,	4 W. (d)	,,	5	5	,,	8. 8 36	,,
,,	5 W.	,,	3	5	2nd Rat.	23.11 36	Ran. Bks.
,,	6 W.	,,	11	6	Plants	16.10.36	,,
,,	7 W.	,,	5	5	2nd Rat.	18.11.36	,,
,,	8 W.	,,	5	5	,,	19.11.36	,,
,,	9 W.	,,	3	9	,,	25.11.36	,,
,,	11 W. (a)	,,	9	6	Plants	29. 2.36	,,
,,	11 W. (b)	,,	7	5	,,	29. 2.36	,,
,,	15 W.	,,	6	6	1st Rat.	4. 9.36	,,
,,	16 W.	,,	20	5	Plants	18.11.36	,,
,,	1 E. (a)	,,	5	5	,,	18. 4.36	,,
,,	1 E. (b)	,,	5	5	,,	18. 4.36	Lat. Sq.
,,	1 E. (c)	,,	5	5	,,	18 4.36	,,
,,	1 E. (d)	,,	4	5	,,	25. 4.36	Ran. Bks.
,,	2 E.	,,	15	6	1st Rat.	10. 9.36	,,
,,	3 E. (a)	,,	5	5	2nd Rat.	15. 9.36	,,
,,	3 E. (b)	,,	3	5	,,	15. 9.36	,,
,,	4 E. (a)	,,	5	5	Plants	30. 5.36	Lat. Sq.
,,	4 E. (b)	,,	5	5	,,	30. 5.36	,,
,,	4 E. (c)	,,	5	5	,,	30. 5.36	,,
,,	5 E. (a)	,,	5	5	1st Rat.	30. 4.36	,,
,,	5 E. (c)	,,	2	5	,,	30. 4.36	Ran. Bks.
,,	5 E. (e)	,,	4	5	,,	30. 4.36	,,
,,	8 E. (a)	,,	8	7	,,	10.11.36	,,
,,	8 E. (b)	,,	6	7	,,	10.11.36	,,
,,	9 E. (a)	,,	9	5	,,	9.12.36	,,
,,	9 E. (b)	,,	3	5	,,	9.12.36	,,
,,	9 E. (c)	,,	2	5	,,	9.12.36	,,
,,	10 E. a)	,,	7	7	Plants	18 2.36	,,
,,	10 E. (b)	,,	8	5	,,	22. 2.36	,,
,,	14 E.	,,	6	6	,,	9.10.36	,,
Sophia	16 E. (a)	,,	5	5	,,	28. 8 36	Lat. Sq.
,,	16 E. (b)	,,	4	5	,,	28 8.36	Ran. Bks.
,,	16 E. (c)	,,	5	5	,,	28. 8.36	Lat. Sq.
,,	16 E. (d)	,,	5	5	,,	28. 8.36	,,
,,	17 E.	,,	10	4	,,	29. 8.36	Ran. Bks.
Diamond	97 G.D.	,,	7	7	1st Rat.	23.11.36	Lat. Sq.
,,	93 G.D. (a)	,,	4	5	Plants	8. 4.36	Ran. Bks.
,,	93 G.D. (b)	,,	5	5	,,	8. 4.36	Lat. Sq.
WEST DEMERARA—							
Wales	10 C. (a)	Manurial	6	6	Plants	26. 9.36	Lat. Sq.
,,	10 C. (b)	,,	6	6	,,	26. 9.36	,,
,,	9 C.	,,	5	5	2nd Rat.	4. 3.36	,,
,,	39 V. (a)	Variety	5	5	Plants	1. 4.36	,,
,,	39 V. (b)	,,	3	5	,,	1. 4.36	Ran. Bks.
Leonora	16 Gv.	,,	7	7	1st Rat.	30. 9.36	Lat. Sq.
,,	53 Sv. (a)	,,	4	5	Plants	17. 3.36	Ran. Bks,
,,	53 Sv. (b)	,,	5	5	,,	17. 3.36	Lat. Sq.
Uitvlugt	64 Z.	Manurial	6	6	,,	12. 9.36	,,
,,	70 Z.	,,	6	6	,,	26. 7.36	,,
,,	33 E.	,,	5	5	2nd Rat.	9.36	,,
,,	13 E.	Variety	5	5	Plants	3. 4.36	,,
,,	46 D.W.	,,	7	7	,,	19. 9.35	,,
,,	42 W.	,,	3	7	1st Rat.	20 3.36	Ran. Bks.
,,	31 E.	Manurial	9	3	Plants	22. 2.36	Complex.
,,	71 M.Z.	Variety	10	5	,,	7.10.36	Ran. Bks.

28. Table V summarises, for each variety, the number of experiments in which it occurs, and their cycle ages.

TABLE V.

VARIETIES IN REPLICATED TESTS, DECEMBER 31, 1936.

Variety.	Number of Experiments as				Total.	Variety.	Number of Experiments as				Total.
	Plants.	1st Rat.	2nd Rat.	3rd Rat.			Plants.	1st Rat.	2nd Rat.	3rd Rat.	
B. 726 ...	2	1	1	...	4	D. 75/30 ...	4	1	...	...	5
B. 755 ...	1	1	1	...	3	D. 79/30 ...	1	1	...	...	2
Co. 213 ...	3	4	...	...	7	D. 81/30 ...	2	1	...	...	3
D. 625 ...		6	7	1	14	D. 84/30 ...	2	1	...	...	3
Diamond 10 ...	9	11	4	1	25	D. 88/30 ...	3	1	...	...	4
F.C. 916 ...	5	1	...	...	6	D. 103/30 ...	2	1	...	...	3
F.C. 998 ...	5	1	...	...	6	D. 113/30 ...	3	2	...	...	5
M.P.R. 7 ...	3	...	..	...	3	D. 127/30 ...	1	...	...	...	1
M.P.R. 42 ...	4	..	...	...	4	D. 147/30 ...	5	...	...	...	5
M.P.R. 44 ..	1	2	...	..	3	D. 150/30 ..	3	1	...	...	4
M.P.R. 49 ...	5	1	...	...	6	D. 151/30 ...	2	1	...	...	3
M.P.R. 145 ...	2	1	...	...	3	D. 164/30 ...	4	2	...	...	6
M.P.R. 151 ...	2	3	...	...	5	D. 165/30 ...	2	1	...	...	3
P.O.J. 2753 ...	2	...	...	...	2	D. 167/30 ...	2	1	...	...	3
P.O.J. 2727 ...	1	...	...	...	1	D. 170/30 ...	5	2	...	...	7
P.O.J. 2878 ...	38	8	6	1	53	D. 173/30 ..	2	2	...	...	4
P.R. 807 ...	3	...	...	...	3	D. 182/30 ...	4	3	...	...	7
P.R. 826 ...	1	3	..	...	4	D. 205/30 ...	2	2	...	...	4
S.W. 3 ...	2	...	...	...	2	D. 219/30 ...	3	1	1	...	5
T. 1198 ...	4	2	1	...	7	D. 232/30 ...	3	2	...	...	5
T. 2020 ...	7	3	...	...	10	D. 235/30 ...	2	1	...	...	3
P.R. 803 ...	3	1	...	...	4	D. 1/31 ...	2	...	...	...	2
D. 747/13 ...	4	2	...	...	6	D. 2/31 ...	...	1	...	...	1
D. 83/17 ...	2	...	...	...	2	D. 7/32 ...	1	...	...	...	1
D. 404/17 ...	2	3	...	...	5	D. 11/32 ...	...	1	...	...	1
D. 52/20 ..	3	3	2	...	8	D. 7/33 ...	3	...	...	...	3
D. 207/20 ...	2	1	...	...	3	D. 8/33 ...	1	...	...	...	1
D. 309/21 ...	1	1	1	...	3	D. 9/33 ...	1	...	...	...	1
D. 628/21 ...	5	2	1	...	8	D. 11/33 ...	1	...	...	...	1
D. 541/22 ...	1	...	...	...	1	D. 15/33 ...	1	...	...	...	1
D. 927/22 ...	3	3	...	...	6	D. 24/33 ...	2	...	...	...	2
D. 36/23 ...	1	1	...	...	2	D. 25/33 ...	1	...	...	...	1
D. 11/24 ...	1	1	1	...	3	D. 27/33 ...	1	...	...	...	1
D. 57/27 ...	4	3	...	...	7	D. 30/33 ...	1	...	...	...	1
D. 284/27 ...	1	...	...	...	1	D. 31/33 ...	1	...	...	...	1
D. 4/28 ...	2	1	2	...	5	D. 34/33 ...	1	...	...	...	1
D. 9/28 ...	2	2	1	...	5	D. 38/33 ...	2	...	...	...	2
D. 11/28 ...	2	1	3	1	7	D. 39/33 ...	2	...	...	...	2
D. 69/29 ...	...	...	1	...	1	D. 40/33 ...	2	...	...	...	2
D. 100/29 ...	1	...	...	...	1	D. 42/33 ...	1	...	...	...	1
D. 137/29 ...	2	...	...	...	2	D. 46/33 ...	3	...	...	...	3
D. 178/29 ...	...	...	1	...	1	D. 57/33 ...	1	...	...	...	1
D. 183/29 ...	...	1	...	...	1	D. 94/33 ...	1	...	...	...	1
D. 39/30 ...	4	1	..	...	5	D. 102/33 ...	1	...	...	...	1
D. 49/30 ...	3	9	...	...	12	D. 107/33 ...	1	...	...	...	1
D. 50/30 ...	4	1	...	...	5	D. 121/33 ...	1	...	...	...	1
D. 51/30 ...	5	2	...	...	7	D. 125/33 ...	1	...	...	...	1
D. 66/30 ...	4	4	1	...	9	D. 295/33 ...	1	...	...	...	1
D. 67/30 ...	1	2	...	...	3	D. 330/33 ...	1	...	...	...	1
D. 71/30 ...	3	...	...	...	3	D. 419/33 ...	1	...	...	...	1

MISCELLANEOUS.

29. Table VI gives the statistics, for recent years, as to the annual expenditure of the Station, seedlings bred, field experiments started and reaped, cane samples analysed, etc.

TABLE VI.

STATISTICS OF SEEDLINGS, FIELD EXPERIMENTS, CANE DISTRIBUTION, CANE, SOIL AND ROOT SAMPLES, CANE SOLD AND VISITS PAID TO ESTATES, 1929-1936.

Year.	Seedlings Basketed.	Field Experiments.		Cane Cuttings Distributed.		Cane Samples.		Soil Samples Taken.	Root Samples Taken.	Cane Sold to Pln. Ogle.		No. of Days Visiting Estates.
		Started.	Harvested.	No. of Cuttings.	No. of Bags.	No. Taken and Analysed.	Cane Crushed (Tons).			Punt-loads Delivered.	Net Receipts. $	
1929	6,100	3	7	...	...	2,200	25	50	...	63	1,099.55	18
1930	9,235	17	1	259,740	1,998	36	1	62	...	54	296.09	90
1931	4,240	17	17	388,700	2,990	731	16	136	...	313	1,444.56	151
1932	5,290	27	34	395,720	3,044	1,134	34	112	...	542	2,974.55	185
1933	18,974	30	47	174,590	1,343	2,490	52	175	1,272	599	3,635.68	259
1934	24,147	30	58	39,978	307	2,425	53	400	560	380	2,767.31	197
1935	19,898	34	55	486,200	3,740	2,719	50	310	...	521	3,720.52	212
1936	23,185	60	71	509,600	3,920	4,804	40	258	...	534	3,378.75	258

30. *Cane Fluff* of the following was sent to the Estacion Experimental Agricola de Tucuman, Argentina :—

Variety.	No. of Boxes.
Co. 213	2
Co. 281	2
Co. 210	2
P.O.J. 2878	2
P.O.J. 2725	2
P.O.J. 2753	1
P.O.J. 2727	1
P.O.J. 2364	1
P.O.J. 36	1
P.O.J. 213	1

31. *Cane Cuttings* of the variety D. 625 were sent to the Agricultural Research Station at Amani, Tanganyika, and to the Central Quarantine Station at Trinidad. To the latter Station also went twelve cuttings of Diamond 10 destined for Jamaica.

32. *Publications.—Sugar Bulletin* No. 5 was issued during the year, the Agronomist, Chemist and Field Manager collaborating in its preparation. The Agronomist contributed to the *Agricultural Journal of British Guiana* (Vol. VII, No. 4), "The Variety and Fertiliser Position of the Sugar Industry, II," and to *Nature* (Vol. 137, No. 3742), in collaboration with the Field Manager, "Fertile Sugar-cane x Millet Hybrid." The Agronomist prepared several notes for the *Farm Journal of British Guiana* and submitted monthly, quarterly and half-yearly reports.

33. *Lectures.*—In the early part of the year lectures on the Sugar-cane were giving to sixteen teachers undergoing a special course in Agriculture and Rural Science.

34. *Rainfall.*—Table VII compares the 1936 monthly rainfall at Sophia Sugar Experiment Station with the monthly average for the sixteen-year period, 1921-36.

TABLE VII.

COMPARISON OF THE RAINFALL AT SOPHIA FOR THE YEAR 1936 WITH THE AVERAGE FOR 1921-36

Month.	Actual Rainfall, 1936, ins.	Average Rainfall, 1921-36. ins.	Excess or Deficit, ins.
January	6.51	8.55	−2.04
February	2.38	3.87	−1.49
March	9.43	4.36	+5.07
April	14.40	5.25	+9.15
May	15.28	11.72	+3.56
June	13.92	14.11	−0.19
July	11.91	10.63	+1.28
August	1.76	8.10	−6.34
September	1.05	2.70	−1.65
October	3.79	3.95	−0.16
November	4.04	5.78	−1.74
December	23.04	14.67	+8.37
Total	107.51	93.69	+13.82

35. The total precipitation was well above the average but abnormally distributed and the excesses registered in March and April, together with prolonged drought from August to November, will adversely affect the 1937 spring crop.

36. *Acknowledgments.*—Sincere appreciation is again expressed of the courtesies extended by the Managers and Staffs of the sugar estates and the close co-operation received from colleagues.

C. HOLMAN B. WILLIAMS,
Sugar Agronomist

March 15, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE CHEMICAL DIVISION FOR THE YEAR 1936.

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REPORT ON THE CHEMICAL DIVISION FOR THE YEAR 1936.

STAFF.

R. R. Follett-Smith, B.Sc., A.R.C.S.—Chemist.
C. L. C. Bourne —Assistant Chemist.

GENERAL.

2. All the members of the staff of the Division were on duty throughout the year. During the latter half of the year Mr. S. Duncan was appointed as a chemist to Messrs. Booker Bros., McConnell & Co., Ltd., and was seconded for soil work in the Division. Mr. Duncan has been in charge of the examination of soil samples from the sugar estates for advisory purposes. He has also been exploring various methods for assessing changes in texture of flood-fallowed soils.

3. The number of soil samples collected and examined for investigational purposes has decreased since the work of the Division now consists of the more detailed examination of fewer samples. The number of soil samples analysed for advisory purposes has increased indicating that greater advantage is being taken of this service. The number of sugar-cane samples analysed at the Sophia Experiment Station has very markedly increased while the number of miscellaneous samples examined also shows an increase.

4. The activities of the Division have included advisory work in connection with the soils of the coastal belt and of the interior. The chemistry of crop production and manufacture forms a large part of the work. The Division has been consulted on numerous occasions regarding the design and statistical treatment of the results of agricultural experiments. During the absence on leave of Mr. H. D. Huggins the examination of the results of an economic survey of the cane-farming industry of the East Coast, Demerara, was under the direction of the Chemist.

5. During the year the Chemist was appointed a member of a committee, consisting of the Government Medical Officer of Health (Chairman) and the Government Analyst, to submit a survey report on human nutrition in the Colony.

6. A large number of samples of final molasses from certain estates were examined in great detail and the results are discussed in a later paragraph. Preliminary work con cerning the factors affecting the quality of parboiled rice has been commenced but serious investigations cannot be undertaken until suitable milling equipment is available. A visit was paid to the rice mill of Mr. H. N. van Dyk at Nickerie, Surinam, and experiments on the artificial drying of sodden parboiled padi were undertaken.

7. Investigations of the lime status of grapefruit soils and comparable analyses of leaves from healthy and unhealthy trees confirm previous findings that the lime problem on such soils is of considerable importance.

8. Root samples of the local Haiaris (*Lonchocarpus Nicou*) have been examined as regards their rotenone content.

EXAMINATION OF SAMPLES.

9. The following samples have been received for examination during the year.

TABLE I.

Soils	374
Sugar-canes	4,804
Final molasses	41
Waters	17
Padi	15
Canned pineapple ...	6
Fertilisers	25
Forage crops	8
Caramels	5
Miscellaneous samples ...	16
Fish-poison plants ...	8
Fruit-cured rum	26

The miscellaneous heading includes samples of sugar, grapefruit leaves, fermented wash, mora sawdust, citronella grass, honey, rum, sulphated syrup and insecticidal powder.

10. The number of samples collected for examination by the Division during the past seven years is shown in Table II.

TABLE II.

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Soil samples	649	436	362	527	583	476	374
Sugar cane samples ...	71	793	1,134	2,490	2,736	2,774	4,804
Other samples	54	116	20	107	128	93	137

The number of soil samples reported in this table does not include the 588 samples collected and examined in the laboratory by Mr. S. Duncan, Mr. L. A. Robinson and their helpers. While the number of soil samples collected for advisory purposes has increased the number collected for investigational purposes has decreased. These circumstances were foreseen in previous reports and are to be expected as the work the Division progresses.

SOIL INVESTIGATIONS.

11. During the period, surveys were made at Pln. Land of Canaan, an area of pasture in the vicinity of Kitty village and the Bath-Eldorado-Abary block while samples, withdrawn by officers of the Department from Pln. Toevlugt, West Bank, Demerara, and from the first five miles of the Kaituma-Arakaka trail, N.W.D., were examined in the laboratory.

12. As regards the soil there appears to be no reason why the Bath-Eldorado block should not be just as fertile as the lands of Plns. Bath and Blairmont.

At the present time there are two possible crops which might be grown in the area—sugar-cane and rice. Both of these crops require a suitable drainage system and an assured supply of irrigation water. It appears that, in times of drought, the water in the river at any point below the Blairmont pumping station is likely to be too salty for the irrigation of sugar-cane. Such water might be used for padi cultivation but in dry weather the level of the river water is probably below that of the land surface. It is very doubtful whether padi cultivation could support the expense of pumping irrigation water. The main problem in this area is not the fertility of the soil but the provision of adequate drainage and irrigation facilities.

13. As regards the Kaituma-Arakaka trail the high-lands within five miles of the river are very limited in extent and are intersected by swamps. These swamps

cannot easily be drained of surplus water and transportation would be difficult. The soils are deficient in plant nutrients and offer little agricultural promise. The soil of the river dam appears to be slightly better than that of the high lands.

The Effect of Continued Application of Sulphate of Ammonia on the Acidity of the Soil.

14. In previous annual reports it has been shown that the soils of the coastal belt of this Colony were originally saline, alkaline clays which had changed or were still changing to non-saline, acidic clays under the influence of drainage, irrigation, tillage and the continued use of sulphate of ammonia.

During the year composite samples of the top six inches were withdrawn from the individual plots of a number of latin square experiments with varied dressings of sulphate of ammonia. These samples were examined regarding thier normal and exchange reactions and their theoretical lime requirements. The results are given in Tables III–V.

TABLE III.

EFFECT OF SULPHATE OF AMMONIA ON NORMAL REACTION.

Estate ...	Pln. Rose Hall.	Pln. Enmore.	Pln. Wales.	Pln. Versailles.
Field ...	R.H. 30.	B.A. 8.	C. 9.	R.D.Z. 31.
Soil ...	Clay.	Clay.	Pegasse.	Pegasse.
No. S/A ...	5.50	5.33	4.76	4.43
2 cwt. S/A ...	5.47	5.16	4.64	4.39
4 cwt. S/A ...	5.28	5.17	4.47	4.24
6 cwt S/A ...	5.43	4.86	4.58	4.33
8 cwt. S/A ...	...	...	4.31	4.18
S.E. of means ...	0.06	0.05	0.08	0.04
Significant differences ...	0.21	0.18	0 24	0.11
P ...	0.01	0.01	0.01	0.01

In all cases continued application of sulphate of ammonia over three crops has had a very definite adverse effect on the normal reaction of the top six inches of soil. At Pln. Rose Hall applications at 4 cwt. per acre (12 cwt. in three crops) have lowered the pH by 0.22 units. It is peculiar that dressings at the rate of 6 cwt. have had no measurable effect. At Pln. Enmore only the applications at 6 cwt. per acre have had a definite effect, causing a reduction of 0.47 pH. On a pegasse soil at Pln. Wales sulphate of ammonia has had an adverse effect even after two crops. The application at 4 cwt. per acre (8 cwt. in two crops) caused a reduction of 0.35 pH while an application at 8 cwt. per acre (16 cwt. in two crops) caused a decrease of 0.45 pH. At Pln. Versailles, after three crops, applications at the rate of 4 cwt. and 6 cwt. per acre caused definite reductions, the atte r dressing being responsible for a decrease of 0.25 pH.

15. The effects on the exchange reaction, which are not so marked, are shown in Table IV.

TABLE IV.

EFFECT OF SULPHATE OF AMMONIA ON EXCHANGE REACTION.

Estate	Pln. Rose Hall.	Pln. Enmore.	Pln. Wales.	Pln. Versailles.
Field	R.H. 30.	B.A. 8.	C. 9.	R.D.Z. 31.
Soil	Clay.	Clay.	Pegasse.	Pegasse.
No S/A. } 2 cwt. } ...	4.23	Linear ... ... Regression	Linear ... ... Regression	3.56 3.55
4 cwt. } 6 cwt. } ...	4.40	only ... ... 6 cwt. S/A.	only ... ... 8 cwt. S/A.	3.48 3.55
8 cwt.	...	= −0.25 pH	= −0.12 pH	3.50
S.E. of means	0.05	...	...	0.02
Significant differences ...	0.16	...	...	0.06
P ...	0.05	0.05	0.05	0.05

At Rose Hall the only definite effect was observed between the high and low dressings. 4 cwt. per acre of sulphate of ammonia (12 cwt. in three crops) caused a decreased of 0.17 pH. At Enmore the reduction in exchange pH was proportional to the rate of application. 6 cwt. per acre (18 cwt. in three crops) caused a decrease of 0.25 pH. At Wales, on pegasse soil after two crops, the reduction in pH was proportional to the rate of application. 8 cwt. per acre (16 cwt. in two crops) caused a reduction of 0.12 pH. At Versailles applications at the rate of 4 cwt. and 8 cwt. per acre caused a definite reduction in the exchange pH.

16. Applications of sulphate of ammonia had no measurable effect on the theoretical lime requirement at Pln. Rose Hall and at Pln. Wales. The results obtained in the other two trials are given in Table V.

TABLE V.

EFFECT OF SULPHATE OF AMMONIA ON THEORETICAL LIME REQUIREMENT. $CaCO_3$ % SOIL.

Estate	Pln. Enmore.	Pln. Versailles.
Field	B.A. 8.	R.D.Z. 31.
Soil	Clay.	Pegasse
No S/A.	0.390	1.218
2 cwt. S/A.	0 404	1.222
4 cwt. S/A.	0.404	1.320
6 cwt. S/A.	0.480	1.269
8 cwt. S/A.	...	1.289
S.E. of means	0.016	0.017
Significant differences ...	0.055	0.051
P	0.05	0.01

At Enmore only the dressings at 6 cwt. per acre (18 cwt. in three crops) had a definite effect on the lime requirements. If the efficiency of liming is considered to be 50 per cent. then an application of 18 cwt. per acre of sulphate of ammonia requires a dressing of 27 cwt. per acre of ground limestone to offset its acidifying effects.

At Versailles, on pegasse, applications of sulphate of ammonia at the rate of 4, 6 and 8 cwt. per acre increased the theoretical lime requirement. Combining the values for these dressings, which do not differ significantly from each other, it appears that dressings of sulphate of ammonia at 6 cwt. per acre (18 cwt. in three crops) requires an application at the rate of 23 cwt. per acre of ground limestone to offset the acidifying effects.

Correlation of Soil Characteristics.

17. The numerous determinations made on forty-five of the composite soil samples obtained during the detailed survey of sugar-cane soils have been examined by means of the system described by McKay (J. Roy Stat. Soc., Ind. and Agr. Res. Sec., I No. 1, p. 62). By this means the correlation coefficients presented in Table VI were obtained.

TABLE VI.

CARD CORRELATIONS BOOKER COMPOSITE TOPSOILS.

	Hardness.	Hydrogen.	Lime.	Magnesia.	Potash.	Soda.	K.	Ratio.	% C.	% Salts.	% Nitrogen.	C/N.	R/S.	P_2O_5 T.	P_2O_5 C.
Hydrogen ...	−0.783	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lime ...	+0.760	−0.866	...	...	...	...	...	...	...	...	...	...	...	...	...
Magnesia ...	+0.822	−0.990	+0.780	...	...	...	...	...	...	...	...	...	...	...	...
Potash ...	+0.142	−0.056	+0 149	−0.049	...	...	...	...	...	...	...	...	...	...	...
Soda ...	+0.583	−0.696	+0.525	+0.655	+0.095	...	...	...	...	...	...	...	...	...	...
Exch. Capacity (K)	−0.372	−0 021	+0.090	−0.001	+0.097	+0.137	...	...	...	...	...	...	...	...	...
Mg0/Ca0 Ratio ...	+0.645	−0.769	+0.484	+0 879	−0.064	+0.559	+0.113	...	...	...	...	...	...	...	...
% Carbon ...	−0.243	+0.464	−0.517	−0.409	+0.396	+0.296	+0.131	−0.166	...	...	...	...	...	...	...
% Salts ...	+0.595	−0.810	+0.546	+0.598	+0.160	+0.613	+0.222	+0.039	−0.597	...	...	...	...	...	...
% Nitrogen ...	+0.068	+0.2855	−0.206	−0.015	−0.247	−0.112	+0.194	+0.234	+0.721	−0.233	...	...	...	...	...
C/N Ratio ...	−0.432	+0.575	−0.534	−0.544	−0.2444	−0.2852	+0.0483	−0.403	+0.793	−0.584	+0.192	...	...	...	...
Rate of Solution	+0 639	−0.631	+0.537	+0.611	−0.021	+0.517	+0.049	+0.046	−0.1635	+0.435	+0.170	−0.373	...	...	...
P_2O_5 Truog ...	−0.295	+0.484	−0.366	−0.488	−0.262	−0.3125	−0.430	−0 503	+0.411	−0.544	−0.017	+0.484	−0.2605	...	...
P_2O_5 Citric ...	−0.499	+0.502	−0 370	−0.548	+0.0924	−0.398	−0.560	−0.543	−0.0047	−0.423	−0 219	+0.1448	−0.256	+0.602	...

18. One of the most interesting points is the very high negative correlation between the percentages of exchangeable hydrogen and magnesium. The individual determinations and the regression lines are shown in Figure 1.

The regression lines for magnesium, calcium and sodium on hydrogen are shown in Figure 2 where the individual determinations are omitted for reasons of clarity.

The regression equations :—

$$\% \text{ MgO} \quad \ldots \quad = 63.0 - 0.69H$$
$$\% \text{ CaO} \quad \ldots \quad = 30.1 - 0.243H$$
$$\% \text{ } Na_2O \quad \ldots \quad = 4.8 - 0.055H$$

suggest that the clay complex, before the entry of hydrogen, contained 63.0 per cent. magnesium, 30.1 per cent. calcium, 2.0 per cent. potash and 4.8 per. cent. sodium in exchangeable forms.

As exchangeable hydrogen begins to enter the absorbing complex the rates of outgo of magnesium, calcium and sodium are in the ratio of 12.5 : 4.4 : 1.0. With progressive unsaturation of the complex it is apparent from figure 2 and from the ratios of coefficients to constants in the above equations that exchangeable magnesium and sodium will disappear from the complex at approximately the same degree of unsaturation while exchangeable calcium still persists. It is somewhat surprising that the proportion of exchangeable potash is unaffected by the degree of unsaturation of the soil. There is a definite but not very close connection between the content of organic matter and the percentage of exchangeable potash in the absorbing complex. It is possible that the exchangeable potash is more closely identified with the organic absorbing complex than with the mineral complex.

Although no precautions were taken to separate the exchangeable bases from the water-soluble bases yet the absence of any definite correlation between the percentage of soluble salts and the total exchange capacity suggests that the figures reported represent bases in exchangeable form.

The mean value for the percentage of exchangeable hydrogen—46.9—indicates that the topsoils are, on the average, half unsaturated.

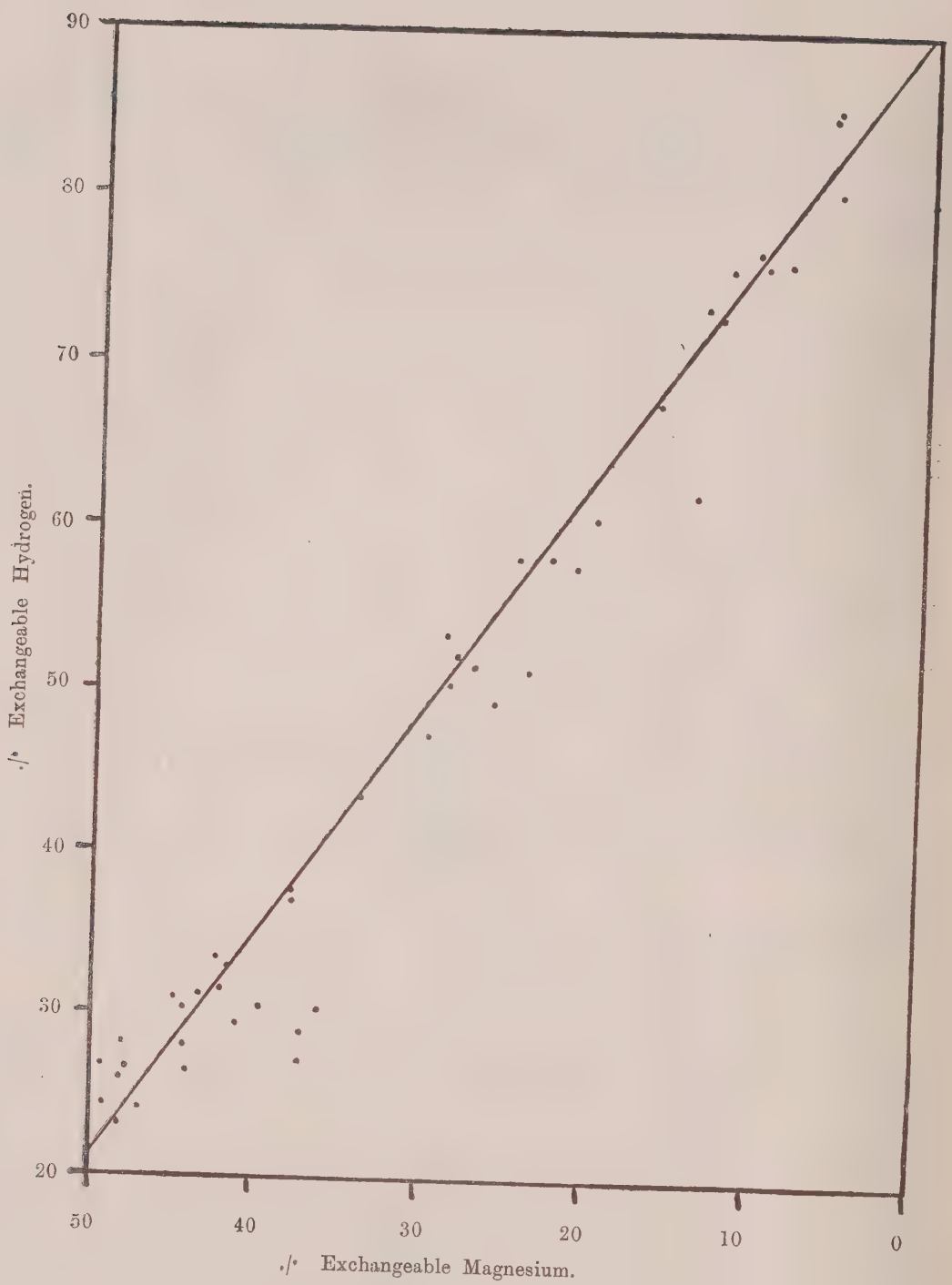
90
80
70
60
50
40
30
20
% Exchangeable Hydrogen.
50
40
30
20
10
0
% Exchangeable Magnesium.

Figure I.

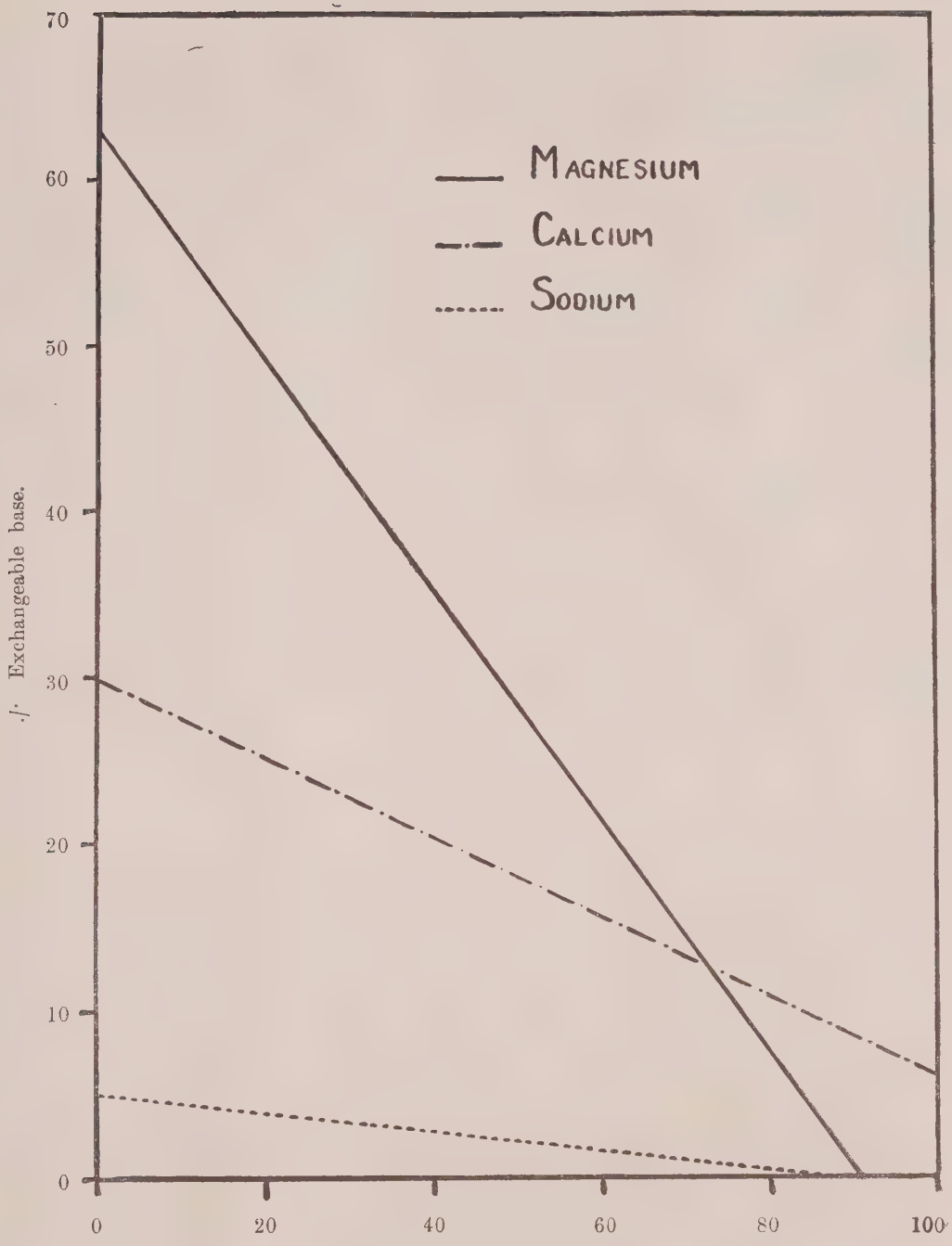
70
60
50
40
30
20
10
0
0
20
40
60
80
100
MAGNESIUM
CALCIUM
SODIUM
% Exchangeable base.
% Exchangeable Hydrogen.

Figure II.

19. Positive correlations between the degree of unsaturation and the carbon content and the carbon nitrogen ratio are to be expected since the pegassy soils are highly acidic. Negative correlations between the degree of unsaturation and the salt content and the rate of solution are also to be expected.

20. It is interesting that the more acidic soils should possess more available phosphate measured either by the Truog method or by the citric acid method. Judging by the definite positive correlation between carbon content and Truog phosphate and the absence of any connection between the percentage of carbon and the citric phosphate it would seem that the Truog method estimates organically-combined phosphates with greater accuracy than does the citric acid method. Such a suggestion is contrary to experience in Mauritius.

21. Crumb hardness, estimated by the Sudan method, is negatively correlated with the degree of unsaturation. Such a connection does not appear to be affected by the presence of more organic matter in the more unsaturated soils since partial regression coefficients eliminating the effects of organic matter or of the carbon nitrogen ratio do not differ in value from the simple correlation coefficient between hardness and unsaturation.

The definite negative correlation between crumb hardness and total exchange capacity is unexpected.

22. The mean values for the several characteristics are given in Table VII. where their variability is indicated by expressing their standard deviations as percentages of their means.

TABLE VII.

Characteristic.	Mean Value.	Index of Variability.
Crumb Hardness ...	46.3	67.6
% Exchangeable Hydrogen ...	46.4	41.4
% ,, Calcium ...	18.7	28.9
% ,, Magnesium ..	30.6	44.6
% ,, Potassium ...	1.45	38.1
% ,, Sodium ...	2.26	60.3
Total exchange capacity ..	25.4	9.9
Magnesium/calcium ratio ...	1.57	30.4
% Clay ...	49.77	9.6
% Nitrogen ...	0.186	17.9
Carbon/nitrogen ratio ...	7.94	15.5
% Carbon ...	1.51	25.1
% Soluble Salts ..	0.037	41.1
Rate of Solution ...	76	86.2
Truog phosphate p.p.m. ...	22.8	47.6
Citric phosphate p.p.m. ...	76.5	59.3

Points of interest in the above table are the large variability of the figures for the rate of solution, crumb hardness, percentage exchangeable sodium and the content of citric acid-soluble phosphate, while the values for the total exchange capacity and the clay content are comparatively uniform.

24. The examination of these results has brought out another point of interest in connection with the sugar-cane soils of this Colony. The alleged occurrence of roman magnesium toxicity (Bird, M., 1925., J. Board. Agric., B.G., pp. 256–261) was discussed in a previous report (1933., Rept. Chem. Div., Dept. Agric., paras. 18–23) where it was shown that the disturbance heretofore attributed to magnesium toxicity could better be explained as a manifestation of soil salinity.

As a result of the announcement of the occurrence of magnesium toxicity it has become the practice, on certain estates, to apply a small dressing of slaked lime at planting to all soils possessing a low ratio of lime to magnesia in the citric acid extract.

It will be seen from Table VI. that the magnesia : lime ratio is negatively correlated in a definite fashion ($P. < 0.01$) with the percentage of exchangeable hydrogen in the complex, while, the latter is negatively correlated with the soluble

salt content. It follows, that soils with a low lime-magnesia ratio will be saline and therefore likely to support canes showing signs of salt toxicity. Such soils possess low lime requirements. The soils with high lime : magnesia ratios are largely unsaturated and require dressings of liming materials.

In short, if the lime : magnesia ratio is to be used as a guide for liming (there are other much simpler tests) than the methods to be followed are the reverse of those recommended in the past. Soils with high lime : magnesia ratio are highly acidic and are in greater need of applications of liming materials. Soils with low lime : magnesia ratios are only slightly acidic and are in less need of such dressings.

25. It has been noticed in field experiments with sugar-cane (Sugar Bull. No. V. p. 100) and with padi (Agric. Jour. B.G., No. VII. pp. 112-3) that dressings of organic matter are not immediately responsible for yield increases. If, however, such dressings are followed some six to twelve months after, with applications of sulphate of ammonia, increased yields are obtained.

26. The mechanism of flood-fallowing was described in paras. 12–19 of the previous report and the position was described in a popular article (Agri. Jour. B.G. VII. No. 4, pp. 227-230). During the early part of the year attempts were made to examine the soils of a flood-fallow experiment by means of the Keen sieving method. It was found, however, that the soil was either too moist and soapy or too dry and hard to be manipulated. It is a pecularity of the magnesium clays of this Colony that the friable period of the soil is extremely limited. Revolver penetration experiments were conducted but the results were inconclusive. Attempts are being made to assess the residual effects of flood-fallowing by measuring the ultimate natural structure of the soil.

MANURIAL INVESTIGATIONS.

Sugar.

27. Manurial experiments with sugar-cane have been continued during the year in co-operation with the Sugar-cane Agronomist and the position in June 1936 was summarised in *Sugar Bulletin*, No. 5 published during the year. The main object of the work hitherto has been the determination of the nitrogen requirements of cane varieties on the different soil types. While such figures were easily obtained for the original standard variety D. 625 the general movement towards the extension of the varieties P.O.J. 2878 and Diamond 10 has necessitated the re-examination of the question of nitrogen requirements. At present there are indications that the ratoons of these newer varieties are capable of utilising economically heavier dressings of sulphate of ammonia.

28. Three field experiments with Diamond 10 plant canes on pegassy clay have indicated that applications of sulphate of ammonia give slightly heavier tonnage of cane than equivalent dressings of calcium cyanamide. Difficulties of storage in this Colony are likely to militate against the use of the latter fertiliser. At the same time the highly acidic nature of the pegasse soils coupled with their high nitrogen requirements necessitate experimentation with non-acidifying nitrogenous fertilisers. Trials with Nitrochalk and with nitrate of soda have been commenced on such soils.

29. The problems of liming and of nitrogenous fertilisation have received a considerable amount of attention during the past seven years. Extended soil investigations are bringing into prominence the importance of the phosphate requirements of the sugar-cane soils of this Colony.

The Truog method of estimating the readily available phosphate content of soils appears to be valuable as an aid to advisory work. More detailed work with this method on the soils of the sugar estates of East Coast of Demerara indicates that there are many areas where the amount of readily available phosphate in the soil is very low. It is to be hoped that more experiments in this connection will be laid down in the near future. Field experiments on pegasse soils deficient in readily available phosphate have shown the value of Niciphos as a source of phosphate.

30. It was stated in the previous report (para. 22) that a number of experiments designed to determine the effects on yield of small dressings of ground limestone and of slaked lime had been established. These trials have been reaped as plant canes and first ratoons and show that such applications have had no measurable effect on yield.

Padi.

31. It has been noted in a previous paragraph that dressings of organic matter followed at a later date by applications of artificial fertilisers are responsible for increases in the yield of padi. A field experiment was carried out in conjunction with the Plant Breeder to test the effect of such treatments. The results are given in Table VIII.

TABLE VIII.

Treatment, Autumn crop, 1935.	Treatment, Autumn Crop, 1936.	Yields Padi. lbs./acre.	
		1935.	1936.
(1) Control	Control	1848	2452
(2) 2 tons/acre Green manure	Residual effect	2148	2332
(3) 2 tons/acre Green manure	2 cwt./acre each of S.A., Super, S/P.	2080	2824
(4) 2 tons/acre Green manure 2 cwt./acre each S/A. and Super.	Residual effect	2672	2360
(5) 2 cwt./acre each of S.A. and Super.	Residual effect	2604	2408
S.E. of means	...	69	79
Significant Differences ...	...	201	236

In the first crop dressings of green manure had a slight immediate effect while applications of artificial fertilisers had a larger immediate effect. The addition of green manure to artificial fertilisers did not improve the immediate effect.

In the second crop the original dressings, of green manure, green manure and artificial fertilisers and artificial fertilisers alone, had no residual effect. The application of artificial fertilisers to the second crop on plots which had originally received green manure gave an increased yield. The increase was, however, no more than might have been expected from the artificial fertilisers alone. In this case, where the artificial fertilisers were applied twelve months after the green manure, no striking yield increases were obtained. In the previous case (Agr. Jour. of B.G. VII., No. 2 pp. 112-3) the artificials were applied seven months after the green manure and striking yield increases were apparent. The experiment is worth repeating with varied time intervals between the application of green manure and of artificial fertilisers.

32. During the year a number of comparable variety trials with padi were executed in the various districts by the Agricultural Superintendents in collaboration with the Plant Breeder. Composite samples of the top foot of soil from the experimental sites were submitted for laboratory examination and the results are compared in Table IX. with the mean yield of padi for each experiment.

TABLE IX.

	Bags/acre.	% O.M.	% N.
Sans Souci	32.0	1.72	0.119
Hope	31.5	2.34	0.176
Courantyne	26.9	2.31	0.189
Henrietta	26.2	1.50	0.104
Vreed-en-Hoop ...	23.2	0.94	0.098
Affiance	21.8	1.21	0.102
Georgetown	21.8	1.35	0.083

The correlation coefficient between yield and organic matter is
+0.7139
that between yield and nitrogen content is
+0.6115

For 20:1 significance a value as high as 0.7545 is required.

There is a strong suggestion, but no definite proof, that higher yields are obtained on areas containing more soil organic matter and that the soil should contain at least 1.50 per cent. of this constituent.

It is hardly to be expected that definite proof would be obtained with such a small number of instances. It would be worth while to continue the examination of soil samples withdrawn from future experiments. Such work might give more definition to this suggested relationship.

OTHER INVESTIGATIONS.

Fish Poisons.

33. Among the more important investigations carried out during the period under review is the examination of samples of haiari root carried out by Mr. L. A. Robinson. At first a considerable amount of difficulty was experienced in duplicating results. Mr. Robinson has described (Agr. Jour. B.G, VII No. 3, p. 191) the modifications adopted by him, and a general description of the position has also been published (Agr. Jour. VII. No. 3, pp. 154–159).

The samples of local haiari root so far examined contain only small quantities of ether extract and of rotenone. It is possible that the difference between *L. Nicou* as it occurs in this Colony and as it is reported in other parts of South America may be varietal or it may be due to a difference in environment. The potential insecticidal value of these plants is being further investigated by the Division with a view to investigating the possibility of improvement. The work is hampered by lack of any generally accepted method of assay.

Grapefruit Leaves.

34. In para. 27 of the previous report results of the analyses of leaves from healthy and unhealthy grapefruit trees were recorded. During the year two further comparable samples of grapefruit leaves, collected at Phlegt Anker, East Bank, Berbice River, were examined. The results of analysis are given in Table X, which includes for comparison the figures given in Table XIV of the previous report.

TABLE X.

CHEMICAL COMPOSITION OF LEAF ASH OF GRAPEFRUIT.

	British Guiana.			Standard.	
	Healthy tree.	Unhealthy tree.	Healthy tree.	Unhealthy tree.	California.	Trinidad.
Ash % Dry Matter ...	10.48 (16.93)*	7.87 (10.85)*	13.16 (19.19)*	11.52 (15.37)*	17.7	13.7
Nitrogen % Total Ash ...	33.0	38.8	14.6	14.2	13.5	19.4
Phosphate % Total Ash ...	3.2	3.9	5.8	12.1	2.1	3.9
Potash % Total Ash ...	20.2	37.5	16.8	31.3	7.2	10.4
Lime % Total Ash ...	47.8	26.6	33.0	19.5	48.4	42.7
N/P_2O_5 ratio ...	10.2	9.9	2.5	1.2	6.4	5.0
N/K_2O ratio ...	1.6	1.0	0.9	0.5	1.9	1.9
K_2O/P_2O_5 ratio ...	6.3	9.6	2.8	2.6	3.4	2.7
CaO/K_2O ratio ...	2.4	0.7	2.0	0.6	6.7	4.1

*Sulphated Ash.

Both the 'good' and 'bad' leaves from Berbice are very high in potash and phosphate and low in lime as compared with standards from other countries. Comparing the 'good' and 'bad' leaves from Berbice it is seen that the 'good' leaves contain much less phosphate and potash and much more lime than the 'bad' leaves. Of the four nutrient ratios all are lower than the standard values except

the potash-phosphate ratio. Of the other three ratios the values for the 'good' leaves more nearly approach the standard figures than do the values for the 'bad' leaves.

The low values for the total ash suggest the need for fertiliser applications. A comparison of the values obtained from healthy and unhealthy trees indicates the value of lime in grapefruit nutrition.

The Sugar Industry.

35. During the year the Chemist was summoned to give evidence before the Labour Commission appointed by His Excellency the Governor. Two graphs were tendered in evidence; the one showing the phenomenal increase in yield of sugar per acre reaped during the period 1920–35, the other showing the very marked drop in the value of the sugar obtained from every acre reaped during the period. The trend lines of the graphs indicated that while the yield of sugar had increased by over 70 per cent. during the period, the value of the sugar obtained from one acre in 1935 was less than half the value obtained in 1920. The graphs were included in the report of the Commission.

36. At a later date an attempt was made to trace the connection between the yield of sugar per acre and the quantity of sulphate of ammonia imported into the Colony. The values for the past ten years are given in Table XI.

TABLE XI.

Years.	Tons of Sulphate of Ammonia Imported.	Colony yield, Sugar per acre.
1926	6,691	1.84
1927	7,271	2.19
1928	6,721	2.16
1929	6,693	2.19
1930	7,207	2.38
1931	7,165	2.35
1932	8,294	2.76
1933	7,681	2.61
1934	7,727	2.54
1935	10,268	3.02

The correlation coefficient between the two variables is $r = + 0.8930$ and the odds against obtaining such a high value by chance are more than 100:1.

The table shows that during the period 1926–1929 the average amount of sulphate of ammonia imported was 6,844 tons per annum as compared with 8,057 tons per annum for the period 1930–1935.

The yield of sugar obtained in any one year is dependent upon the amount of sulphate of ammonia applied during the previous year but it must be remembered that stocks of sulphate of ammonia are held in this Colony and that the amount of ammonia used in any one year may be gauged by the amount imported during the following year.

It is not for one moment suggested that the increased yield is entirely due to the larger importation of sulphate of ammonia; it is recognised that other beneficial factors such as increased flood-fallowing and irrigation, improved drainage and factory work, the elimination of mixed varieties, the extension of heavier yielding canes and, possibly, the control of insect pests have all had a progressive effect, year by year, on the yield of sugar.

It is possible, by mathematical processes, to eliminate the effect of all these factors and to consider independently the contribution which larger importations of sulphate of ammonia have made to the heavier yields obtained.

The strength of the connection between these two factors, having eliminated other factors, may be judged by the value obtained for the partial correlation coefficient.

$$r = + 0.7486$$

the odds against obtaining such a high value by chance are nearly 50 : 1.

The equation connecting yield with tonnage of sulphate of ammonia imported and with other beneficial factors is :—

$$\text{Yield} = 0.145\ T + 0.063\ y + 0.96$$

where T = Tonnage imported (thousands of tons)
y = year (1925 taken as zero).

It is of interest to work out the values for this equation for the years 1926-1935 and to compare the calculated yields with the actual yields obtained.

TABLE XII.

TONS 96° SUGAR PER ENGLISH ACRE.

Year.	Due to Sulphate of Ammonia.	Due to other causes.	Constant.	Calculated yield.	Actual yield.
1 (1926) ...	0.972	0.064	0.956	1.99	1.84
2 (1927) ...	1.056	0.127	0.956	2.14	2.19
3 (1928) ...	0.976	0.191	0.956	2.12	2.16
4 (1929) ...	0.972	0.254	0.956	2.18	2.19
5 (1930) ...	1.046	0.318	0.956	2.32	2.38
6 (1931) ...	1 040	0.381	0.956	2.38	2.35
7 (1932) ...	1.204	0.445	0.956	2 60	2.76
8 (1933) ...	1.115	0.508	0.956	2.58	2.61
9 (1934) ...	1.122	0.572	0.956	2.65	2.54
10 (1935) ...	1.491	0 635	0.956	3.08	3.02

It is admitted that correctness of the association depends on the assumption that the amount of sulphate of ammonia used in any one year may be measured by the amount of sulphate of ammonia imported during the following year.

It is certain that improved estimations could be made if the actual amount of sulphate of ammonia used in the various years were known. The method can be employed to give an estimate of the effect of sulphate of ammonia on the yield of sugar when such values are available. At the same time the figures given in Table XII. prove beyond doubt that the very marked increase in yield during the past ten years has been associated with a large increase in the importation of sulphate of ammonia.

37. Samples of final molasses and of fermented wash were forwarded during the year from a certain factory where the attenuation obtained was below normal. Experiments in the laboratory indicated that a normal attenuation could be obtained with the sample of molasses submitted and such results suggested that the lack of adequate attenuation was due to some fault in the distillery itself rather than in the final molasses. A general cleaning of the distillery and the use of an antiseptic such as a 1 per cent solution of ammonium fluoride was advised. Subsequent enquiries showed that the distillery worked normally when such precautions were taken.

38. At the same time it was found that the amount of unfermented glucose left in the wash obtained in the laboratory was rather higher than the values reported in the literature. It was thought that the small quantities of copper present in the original molasses might affect the course of fermentation. It was found that the addition of copper at the rate of 10 p.p.m. definitely retarded fermentation. Estimations of the original copper content of the molasses showed that it was higher than that found in molasses from other factories.

39. During the year 37 samples of final molasses from estates on the East Coast of Demerara were examined as regards their refractometer brix, specific conductivity, reaction and their content of glucose, sulphated ash, silica, iron, lime, magnesia, potash, soda, phosphates, chloride and sulphate. It has not yet been possible thoroughly to examine the results but marked correlations are apparent between the conductivity and sulphated ash, the moisture content and the total sugars on 100 parts of water, the potash content and the chloride content. The

latter correlation suggests that the potassium present in the final molasses is in the form of the chloride. The statistical examination of the results is being continued.

40. Early in the year the Division was consulted as to the reason why certain samples of final molasses proved unpalatable. It was suggested by the Government Veterinary Surgeon that the lime content of such samples might be above the average. Representative samples were analysed and indicated that the lime content was normal.

41. During the year the Division was approached regarding the tin content of Demerara yellow sugar. The enquiry followed the prosecution by the Buckinghamshire County Council of a grocer for selling yellow crystal sugar containing 0.77 grains of tin per pound (110 p.p.m.). The case has been discussed in an article (Chemical Age. Dec. 26, 1936) where it is stated that it is on record that in 1890 the quantity of tin varied from 0.25 to 0.33 grain per pound (36 to 47 p.p.m.) and that in 1890 the West India Committee were advised, as the result of feeding experiments on dogs, that there was no danger to health in this proportion. The maximum permissible proportion in canned goods is generally accepted as 2 grains per pound (286 p.p.m.). If it is possible to prepare acceptable yellow crystal sugar containing only 36 to 47 p.p.m. of tin then there is no necessity for larger contamination by tin. On the other hand if 286 p.p.m. of tin are permissible in canned goods then it is difficult to follow the reasoning of the public analyst who declares half that quantity in sugar to be harmful.

42. A considerable amount of time has been devoted to the clarification of fruit-cured rum. Such rum, when held at low temperature (below 0°C) for twenty-four hours, forms a precipitate which spoils its appearance. The precipitate, which disappears when the rum returns to a normal temperature, is greater in rums of strength from 14°–24° under proof. The tendency to form a precipitate, which appears to be a result of using fruit for curing, can be checked by the addition of suitable clarifying agents followed by filtration.

The Rice Industry.

43. During the year some attempts have been made to investigate the factors affecting the quality of parboiled rice. The quality of the product is judged by its colour, the degree of breakage and the odour. The Division possesses a small hand-huller which is of limited value in assessing the factors contributing to odour and breakage. It cannot be used in a study of the factors affecting colour.

Preliminary experiments with this hand-huller and with the apparatus designed by F. A. Squire for measuring breakage force indicated that parboiled rice was harder than white rice, that the increase of hardness was a result of steaming and that the hardness of the parboiled grain was a function of the moisture content. The apparatus designed by F. A. Squire measured the crushing strength and it is doubtful whether such measurements adequately reflect the conditions inside a huller where the elasticity of the grain may be a factor in breakage. A considerable amount of interesting preliminary work in connection with the breakage of parboiled rice has been carried out by Prof. Stahel in Surinam.

44. It has been suggested that the initial acidity of the water used for steeping has some effect on the final quality of the product. Quantities of padi were steeped with water adjusted by means of buffer solutions to varied reactions. It was found that the various solutions approached a common reaction value after a short time. Results are shown in Table XIII.

TABLE XIII.

Initial pH of steeping water.	Final pH of steeping water after 2 hours.	After 18 hours.
2.0	3.74	6.12
4.0	5.80	6.17
6.0	6.20	6.24
8.0	7.33	6.66

Samples of water used in hot, warm and cold steeping were analysed with the following results:—

TABLE XIV.

ANALYSIS OF STEEPING WATER, P.P.M.

	Chloride.	Potash.	Soda.
Cold	553	593	131
Warm	504	613	43
Hot	525	800	38

It seems unlikely that the initial reaction of the steeping water can have any effect on the quality of the resulting rice.

45. A considerable number of samples of padi have been submitted for moisture tests during the year. The majority of the samples are packed for transmission to the laboratory in bags of cloth or sacking. It is doubtful under these circumstances whether the values for moisture obtained from such samples bear much relation to the moisture content of the main bulk of padi at the time of sampling. The moisture content of padi varies with the relative humidity of the air.

46. Later in the year a visit was paid to the rice mill of H.N. van Dyk at Nieuwe Nickerie, Dutch Guiana. A mechanical drier for handling rain-damped padi had been erected and preliminary experiments were made to see whether this equipment could be used to dry sodden parboiled padi straight from the steeping tanks.

A quantity of padi (about 140 lb.) was parboiled and divided into two lots. One lots was dried on concrete in the usual way, representative samples being taken at intervals to determine the moisture content and the milling qualities. The other lot was placed on perforated sheets and dried in a current of warm air, representative samples being taken at intervals. The results of examination of the samples are given in Table XV. The tables include the moisture content of the padi, the recovery of whole grain as a percentage of padi, the recovery of broken grain as a percentage of padi the total recovery (whole and broken grains) as a percentage of padi and the percentage of whole grains in the resulting rice.

TABLE XV.

PADI DRIED ON CONCRETE.

Description of Sample.	% Moisture.	Per 100 of padi.			% whole grain in rice.
		Whole grain.	Broken grain.	Total grain.	
(1) Sample from steeping tank ...	34.2	...	...	...	...
(2) Sample dried on concrete for three hours ...	17.2	61.0	8.7	69.7	87.5
(3) Sample (2) left in sample tin for 18 hours ...	17.2	65.9	5.0	70.9	92.9
(4) Sample dried on concrete for six hours and left in sample tin for 15 hours ...	12.6	51.0	21.5	72.5	70.4
(5) Sample dried on concrete for six hours and left in covered bag for 15 hours ...	13.6	51.5	18.3	69.8	73.8

PADI DRIED IN BLOWER.

Description of Sample.	% Moisture.	Per 100 of padi.			% whole grain in rice.
		Whole grain.	Broken grain.	Total grain.	
(1) Sample from steeping tank ...	34.2	...	...	...	...
(2) Sample after 1 minute blowing ...	31.2	...	...	...	...
(3) Sample after 15 minutes blowing ...	29.2	25.6	27.4	53.0	48.3
(4) Sample after 45 minutes blowing ...	20.0	64.0	5.0	69.0	92.7
(5) Sample after 90 minutes blowing ...	12.0	20.2	49.0	69.2	29.2
(6) Sample after 90 minutes blowing but left in sample tin for 18 hours ...	12.0	14.3	57.6	71.9	19.9
(7) Sample after 90 minutes blowing but collected 24 hours after ...	10.8	15.3	51.1	66.4	23.0

The moisture determinations were made with an official Brown Duval moisture tester and the milling figures were obtained with a Universal Milling Device which

turns out an excellent sample of rice but naturally gives whole grain yields slightly in excess of those obtained in a full-scale mill.

As regards the padi dried on the concrete an exposure of three hours was sufficient to bring the moisture content down from 34.2% to 17.2% and to produce samples which have a good total recovery and a low percentage of broken grain. Comparison of samples 2 and 3 indicates the value of a rest period between drying and milling. Exposure for six hours on the concrete reduced the moisture content to 12.6% and occasioned a marked increase in breakage.

The results obtained with the padi dried in a current of hot air are of great interest. During the first fifteen minutes the temperature of the air did not rise aboav 36°C yet an appreciable amount of drying took place. At this stage, however, the padi was not sufficiently dry to give either a high total recovery or a large percente age of whole grain. The sample collected after forty-five minutes in the drier gave a good total recovery and a high percentage of whole grain, the temperature of the air rising at this period to 45°C. A further period of forty-five minutes during which the temperature rose to 64°C brought the moisture percentage down to 12.0%, the resulting padi was, however, too dry to give a high recovery of whole grains.

It is apparent from these preliminary trials that sodden padi, straight from the steaming tanks, can be dried by artificial means within a period of about forty-five minutes to a moisture content suitable for milling. As far as could be seen such artificial drying had no deleterious effect on either the colour or the odour of the parboiled rice.

The results of the experiment are of very considerable importance showing, as they do, that mechanical drying is possible.

The results indicate that the percentage recovery of whole grain rice is dependent upon the moisture content to which the parboiled padi is dried before milling. Inspection of the attached figure suggests that parboiled padi should be dried to a moisture content between 16% and 21% if high yields of whole grain rice are to be obtained. Such values are likely to vary with different varieties of padi, with full-scale hullers and with different settings of the hullers. They show, however, that parboiled padi should not be intensely dried before milling. Such results are in agreement with the recent work of Prof. Stahel.

The Universal Milling device which was used in these preliminary experiments will handle small samples of padi or parboiled padi and gives results, as regards colour, odour and breakage, similar to those obtained in the factory. Such a piece of equipment could be invaluable to the Department in its work on the problems affecting the quality of parboiled rice.

Limestone.

47. Supplies of pulverised limestone used in this Colony are obtained from Trinidad. Recently samples of a similar product from Barbados have been received in the laboratory. The latter samples compare favourably with the Trinidad product in composition and in degree of subdivision.

48. Other miscellaneous investigations have included attempts to determine the lowest concentration of sodium chloride detected by taste by the average person; the oil content of samples of citronella grass; the ammonia content of various samples of water in relation to mosquito breeding, the reaction value of sugars and the acidity and taste of samples of caramel.

ACKNOWLEDGMENTS.

49. It is a pleasure to record an appreciation of the work of the staff during the period under review.

R. R. FOLLETT-SMITH,
Chemist.

February 18, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE BOTANICAL AND MYCOLOGICAL DIVISION FOR THE YEAR 1936.

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REPORT ON THE BOTANICAL AND MYCOLOGICAL DIVISION FOR THE YEAR 1936.

STAFF.

E. B. Martyn, B.A., A.I.C.T.A. ... Botanist and Plant Pathologist.
N. Persaud ... ... Laboratory Assistant.

DISEASES OF MAJOR CROPS.

Sugar Cane.

'Top Rot'—A small outbreak of a form of Top Rot that has been noticed and described previously in the colony (c.f. Reports for 1923, 1924 and 1925) occurred on an estate on the East Coast, on D. 625 about 6 months old. The disease became evident in August, at the end of the mid-year rains, over a small area of about half an acre, in one field only. Inspection showed the leaves of affected plants to be yellowed for 2–3 feet back from the tips, the part nearest the tip sometimes showing brown or red-brown streaks. In badly affected plants the youngest leaves were dead and brown, and on cutting open such plants a soft, putrescent rot was found, accompanied by a dark red discolouration which involved the growing point and the first few nodes, but did not extend far down the stem except when accompanied by 'borer' damage. Crumpling of the last open leaves was also apparent. Though the yellowed cane tops of the diseased plants make the outbreak conspicuous, the disease is apparently never very serious, and in this case, after the field had been irrigated twice (continuous dry weather having set in immediately after the rains) the affected plants recovered.

Abnormal appearance of leaves.— During September a visit was paid to another estate on the East Coast to examine a few stools of D. 625 on the windward border of one field which showed a peculiar discolouration. The canes in question appeared rather unhealthy, the outer leaves being chlorotic, and in some cases drying out. Scattered over these leaves were brown to purplish brown specks, whilst in some cases the greater part of the under surface of the leaf was covered with purplish brown blotches, similar blotches appearing here and there on the stems, though only noted on the exposed side (these canes were on the outermost row in the field). The heart leaves of these stools, however, were green and healthy, and the abnormal blotching of leaves and stems was assumed to be due to some environmental factor which had temporarily affected the canes and was of no consequence.

Rice.

No disease of this crop was reported during the year and the sclerotial disease described in the report for 1935 did not occur again.

Coffee.

Thread Blight.—Some specimens of leaves affected apparently by *Corticium Koleroga* were received from the West Coast, Demerara, in January.

DISEASES OF MINOR CROPS.

Citrus.

Scab Disease (*Sporotrichum citri*) was observed on a plant of "Sampson" Tangelo at Wauna substation, North West District.

An entomogenous fungus identified at Kew as *Aschersonia cubensis* Berk., was found associated with a lecanid scale on grapefruit leaves sent from No. 2 Canal, West Bank, Demerara.

Cacao.

Witch Broom.—A tree at Middlesex, No. 2 Canal, West Bank, Demerara, which had been kept under observation for some time as being apparently free of witchbroom, and which was heavily pruned earlier in the year, was found during August to be affected by the disease.

Tomatoes.

Root Knot, (Heterodera radicicola)—was observed on some plants from a garden in Lodge Village, Georgetown.

Ground Nuts.

Wilt.—A wilt of nearly mature ground nuts occurred at substation Cecilia in July. The leaves of affected plants became brown and shrivelled, and the cortex of the stem appeared discoloured. A species of *Thielavia* was found associated with the disease, ascocarps of the fungus being plentiful on the dried tissues of dead plants.

ACKNOWLEDGMENTS.

Imperial Mycological Institute.

Thanks are due to the Institute for unfailing advice upon matters referred to them.

FISH POISONS.

Analyses of the Black and White Haiaris at the Experiment Stations in the North West District showed that only the roots contained sufficient quantity of toxic substances to be worth further investigation. This matter is further dealt with in the Report of the Chemist-Ecologist.

The habit of the roots of these plants at the stations in question, however, where one or two main roots spread out, sometimes to a depth of two or three feet, and become intermingled with the roots of neighbouring plants, suggest that the collection of this material on a commercial scale would offer considerable difficulty. A short article on the Haiaris and other Fish Poison Plants was published in the Agricultural Journal, Vol. VII, 3, p. 154. Reference was made therein to a leaf spot which had previously only been observed on leaves of Black Haiari and never on those of White. This has now, however, been observed on White Haiari also.

FORESHORE VEGETATION.

Observations continue to be made on the foreshore vegetation, with particular attention to the spread of Rice Grass (*Spartina brasiliensis*) and subsequently of Courida (*Avicennia nitida*) and Mangrove on the newly formed mud banks, and photographs are taken periodically to trace the progress of the changes occurring. A note on this matter was published in the Agricultural Journal Vol. VII, 3, p. 182.

JENMAN HERBARIUM.

The indexing of the Phanerogams in the Herbarium has now been completed and typescript copies of the card index are to be made. The remounting of the specimens continues.

A number of duplicates of material collected by Hohenkerk on the Cattle Trail, Survey in 1919, and duplicates of other material collected by members of the present Forestry Department, and previously by Anderson when attached as Forestry Officer to the Lands and Mines Department, have been named, partially by reference to lists now in the possession of the Forestry Department and partially at Kew. In addition, a number of unnamed specimens collected by Abraham on the Cattle Trail Survey in 1919, by the Boundary Commission in the Rupununi District in 1933, and by Archer in the North West District and near H.M.P.S. in 1934, together

with a quantity of miscellaneous material from various sources, were named by the authorities at Kew, Mr. Sandwith being responsible for the greater part of the determinations.

The material of Verbenaceae sent to Kew in the previous year was returned with Dr. Moldenke's determinations. Specimens of one or two other families have been despatched during the year for examination by authorities interested in particular groups, and returned with their comments.

MISCELLANEOUS.

The Botanist continued the supervision of the North West District Experiment Stations and the experimental citrus orchards. A visit was paid to the district in October.

From June to the end of the year the Botanist undertook the editing of the Agricultural Journal and of the new Farm Journal, owing to the absence of the Editor on leave.

E. B. MARTYN,
Botanist & Plant Pathologist.

January 5, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE ENTOMOLOGICAL DIVISION FOR THE YEAR 1936.

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REPORT ON THE ENTOMOLOGICAL DIVISION FOR THE YEAR 1936.

STAFF.

L. D. Cleare, F.R.E.S., F.L.S.—Entomologist.
C. Williams —Laboratory Assistant.

Mr. F. A. Squire, Supernumerary Entomologist, left the Colony on February 20, 1936, on leave of absence prior to the termination of his engagement.

Mr. C. Williams, Laboratory Assistant, was on sick leave from October 7—16 and again from October 26 to November 12; in addition Mr. Williams had casual leave from November 13—21 and went on vacation leave for three months from November 22.

INSECTS AFFECTING MAJOR CROPS.

Sugar Cane.

2. With the establishment of the Amazon Fly, *Metagonistylum minense* Towns., throughout the sugar growing area it became evident, that in confirmation of laboratory rearings, this insect was not attacking the Yellow-headed moth-borer, *Diatraea canella*, in appreciable numbers. Inquiries were received as to whether later with the reduction of *Diatraea saccharalis* the parasite could be expected to attack *Diatraea canella* in greater and increasing numbers, and also whether in view of the fact that some of this host was now attacked it would be possible to rear a *canella*-attacking strain of the parasite. No hope could be held out in either of these directions, but it was decided that experimental rearings on *Diatraea canella* should be undertaken and that the fly should be reared thus through several generations. Accordingly a sum of $240 was provided by the British Guiana Sugar Experiment Station Committee for this work, and during the year such rearings were undertaken. As was anticipated the results obtained have not been encouraging and there has been no indication of the development of a strain more tolerant to the *canella* host. It is proposed to publish a full account of this work at an early date. For the supplies of *canella* larvae used throughout the investigation I am indebted to Mr. A. Murrison, Manager of Plantation Uitvlugt, and wish to express now my appreciation and thanks for his assistance.

3. While it is generally recognised that the Amazon Fly has established itself in the Colony, both in sugar-cane and rice, reports were received during the year of outbreaks of small moth-borer in individual fields on some sugar estates. Investigation of some of these outbreaks showed heavy parasitism of *Diatraea saccharalis* when the examination was undertaken, but generally also that there had been a severe attack of moth-borer at a period a short time prior to the examination; occasionally there was also a preponderance of the yellow-headed borer, *Diatraea canella*. Nevertheless there has been a certain amount of concern, and in some quarters doubt, as to the efficacy and success of the parasite. It has been considered desirable, therefore, to undertake a status survey of the fly and provisions has been made for this during 1937.

4. Whatever is the final status of the Amazon Fly, it is evident that it cannot be expected to exert any appreciable control of the yellow-headed borer *Diatraea canella*. A great *desideratum* at the present time, therefore, is an efficient parasite for this insect.

5. There were a few outbreaks of a greater or lesser extent of the Yellow Cane Aphis *Sipha flava* Forbes, on estates both in Berbice and Demerara during the year. This insect appears to be slowly but surely becoming more prevalent in the canefields and must now be considered among the major pests of this crop. The local predaceous enemies play their part in holding the insect in subjection, but it is

evident that they are unable to cope entirely with the situation. Spraying as a means of control may be effective in small and localized attacks in young canes but is not to be recommended in outbreaks of larger proportions or in taller canes, while the removal and destruction off affected leaves as is sometimes practised is but of little avail. It would appear, therefore, that the time is not far distant, if it has not already arrived, when it will be necessary to consider other means of combating this insect. If the insect is a recent introduction to our canefields—and conditions generally point to this—then the introduction of an efficient parasite offers perhaps what is the most promising line of attack.

6. There were outbreaks of Hardback beetles, *Ligyrus ebenus* DeG. in Berbice, and *Dyscinetus geminatus* F. and *Dyscinetus bidentatus* Burm. in Demerara, and in some instances not inconsiderable areas were affected. Flooding the fields is a very efficient control for the first two and fortunately can be practised in the majority of attacks. With the last-named insect this method of control is not effective however, and at present there is little else to be done but replant the fields as soon as possible.

Rice.

7. An experiment laid down in connexion with the storage of padi at the beginning of August is still continuing. There is, therefore, no report to be made in this connexion at present.

8. There were the usual outbreaks of Rice Caterpillars, *Laphygma frugiperda* S. & A. in nursery beds and broadcast rice at the beginning of the rains, and slight attacks of Padi Bug *(Momidea poecila* L.*)* when the grain was maturing, but weather conditions were unfavourable to the latter insect.

Coconuts.

9. The outbreak of Coconut Caterpillar, *Brassolis sophorae* L., reported last year in Kitty Village continued this year and by July a new, and third generation of the insect had commenced its life cycle. Up to that time no attempt had been made to control the insect. The recent enactment of the Plant Diseases and Pests (Prevention) Ordinance (No. 37 of 1935) gave the necessary authority to the Department to deal with the situation, and a campaign against the insect was immediately started. About the same time the pest appeared in Lodge Village also.

10. House to house visits were made in these villages and property owners instructed as to the measures necessary to combat the insect. Two lantern demonstrations were given also showing the various stages of the insect, the damage it performed, and the measures to be pursued in controlling the pest. The palms in Kitty Village were in most instances almost denuded of their leaves, but have made remarkable recovery since they have been rid of the pest. The speedy recovery of the palms has demonstrated the efficacy of the measures recommended, and incidentally shown that the generally accepted idea of the ill effects that follow the removal of leaves is without foundation.

11. A number of palms died as a result of the attacks of the insect. It was estimated that in Kitty Village of 3,319 coconut palms that were attacked 280 palms or 8.4 per cent. had died as the result of the pest by September.

12. In the Abary District also there were outbreaks of this insect at Letter T estate and at Little Abary Village. The proprietors at Little Abary in some instances did not respond to the advice given and it was necessary eventually to bring the Plant Diseases and Pests (Prevention) Ordinance into operation. Only one prosecution was made, however, in the nature of a warning and a conviction was obtained. It is hoped that it will not be necessary to bring the Ordinance into operation in most instances, for it is believed that the mere knowledge of the existence of such legislation will go a long way to accelerate action.

13. There was an outbreak of the large locust, *Tropidacris latreillei* Perty, on the Courantyne Coast in July, the area affected being from No. 50 village to No. 65 village. The attack varied considerably in intensity in the different areas but it was only at No. 51 village that serious damage was inflicted. Even at this place the damage was not very extensive and other crops were not affected. Compared with the outbreaks of this insect which we have seen in the same areas on previous occasions it could not be viewed with alarm. At the time the opinion was expressed that the outbreak would not assume greater proportion and subsequent events confirmed this view.

OTHER INVESTIGATIONS.

Rats.

14. From time to time throughout the sugar-growing area outbreaks of rats occur, and while these are in their respective areas important enough it may be said that generally rats do not affect seriously sugar-cane in this Colony.

15. In November an outbreak of rats occurred at Blairmont Estate, Berbice, of a proportion unprecedented as far as actual records are concerned and also in the memory of most sugar planters in the Colony. Shortly after the commencement of the outbreak I visited the estate, and subsequently on other occasions.

16. From the conditions observed the opinion was expressed from the beginning that the rodents were invading the estate from the savannahs which abut it on the rear. Subsequent events confirmed this. Later on specimens of this rat were determined by Mr. T. C. S. Morrison-Scott of the British Museum as *Holochilus* sp. These rats are "water rats" and closely related to the "Hamsters" of Europe.

17. Different baits were tried as a means of control, including the well known barium carbonate cakes used in other parts of the world against rats attacking sugar-cane. Although most of the baits used were taken to a small extent it cannot be said that any of them was consumed in a sufficient quantity to allow the opinion that it might be an effective means of control while the damage continued unabated. This is quite understandable as such "water rats" often feed largely on vegetation and there were ample supplies of such food in the form of sugar-cane readily available.

18. Catching was then resorted to and large numbers of the rats were thus secured. Through the courtesy of the Manager of Blairmont Estate, Mr. G. M. Eccles, I am able to gave the following figures of the number of rats thus collected —November (last week only) 1,153, December 37,800. Catching of the rats has continued and is still in progress at the time of writing, large numbers of the rodents being still secured.

19. As might be imagined the damage caused by the rats has been extensive and in individual fields it is estimated that the loss will be as high as 50 per cent. of the crop.

20. On some other sugar estates in Berbice rats were also prevalent but in no instance was the outbreak comparable to that of Blairmont Estate. In individual fields however, the losses were in some instances quite as high. On two other estates specimens of the rats were secured and proved to be the same species.

COLLECTION AND LIBRARY.

21. For some years now the insect collection has been in need of a better arrangement of cabinets and a start was made in this direction prior to my secondment for the moth-borer investigation. Unfortunately nothing has been done since and on my return a fresh start was made in this direction. During the year sixty old cases were remodelled as drawers and six cabinets made to accommodate them. These cabinets are built on a sectional plan so that the whole system is capable of extension as the collection increases, and a fairly satisfactory arrangement has been

evolved. Some further work is required in this connexion as well as additional sections, and it is hoped that it will be possible to do this in the coming year

22. A start has been made on arranging the alcoholic collection also, and in due course it is hoped that this will likewise be in a satisfactory state.

23. The cataloguing of the collection, which takes good deal of time and labour, has been kept up to date during the year.

24. It was possible towards the end of the year to obtain a few additions to the library of the Division, and also to undertake some binding which has been long overdue.

PLANT PROTECTION SERVICE.

25. After a long period of waiting new plant protection legislation has been enacted in the form of the Plant Diseases and Pests (Prevention) Ordinance of 1936. With the coming into force of this Ordinance the Department has now the necessary machinery for dealing with outbreaks of pests and for the inspection of plant imports and exports. The possession of the necessary machinery is but little use, however, without the men to operate it, and this is one of the pressing needs of the Division.

26. In British Guiana, for some years to come at least, it will be necessary to do more than merely give advice in connexion with insect control if the measures recommended are to succeed. At present time in most instances it devolves, if not actually in the performing of the work, to the supervision of it by an actual presence on the spot.

27. In the event of outbreaks of pests, or even in the matter of the control of minor attacks, to do this often means the interruption of investigation work that is in hand—work that is of the first essential in order to be able to give advice as to control—which may have taken considerable time and difficulty to get to the stage which it had reached. A great *desideratum* of the Division at the present time, therefore, is an increase of staff in order to meet such needs. At present there are a number of matters in connexion with major pests the further investigation of which would be well repaid but which must of necessity be put aside indefinitely.

28. The Plant Diseases and Pests (Prevention) Ordinance was first put into operation in connexion with the clean-up campaign against Coconut Caterpillar in Kitty Village. There can be little doubt that the mere knowledge of the existence of legislation did much to facilitate the work and largely accounted for the smoothness and speed with which the palms in that Village were cleaned on this occasion and the pest brought under control. If nothing else it demonstrated that such legislation had been a necessity.

29. Unfortunately it was necessary to bring the Ordinance into force in dealing with another outbreak of the same insect at Little Abary, Mahaicony—Abary District. In this instance, however, only one prosecution was instituted in the nature of an example and it had the desired effect.

IMPERIAL INSTITUTE OF ENTOMOLOGY.

30. During the year the Division has received again the benefits of the services of the Imperial Institute of Entomology as regards the determination of specimens as well as in other directions and opportunity is taken to acknowledge such assistance.

L. D. CLEARE,
Government Entomologist.

February 18, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE BOTANIC GARDENS FOR THE YEAR 1936.

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REPORT ON THE BOTANIC GARDENS FOR THE YEAR 1936.

STAFF.

E. B. Martyn, B.A., A.I.C.T.A.—Superintendent, Botanic Gardens.
H. A. Cole —Agricultural Instructor (Horticultural Assistant).
P. O. Jackson —Probationer (Clerical Assistant).
M. Sheriff —Nursery Foreman.

GENERAL.

The weather during the year was marked by the very early onset of the mid-year rains, which began in March and continued till August. The autumn dry season was then followed by heavy rain in December.

Two further sections of the old Pipe lines, one south and one north of the avenue, were put into commission and stand pipes erected. This enables the major part of the Flower Garden south of the avenue and a part north of the avenue to be watered by hose. Unfortunately the Pipe line west of the bandstand was found to be in too bad a condition to be reconnected.

The large irrigation tank behind the stables, erected in 1881, and now of no further use, though still in good condition, was dismantled and removed by the Public Works Department early in the year.

The Entrance gates and Bandstand were repainted in February.

The following table shows the amounts spent under the votes accorded to the Gardens :—

	Vote.	Expenditure.
Botanic Gardens—Maintenance	$ 5,000	$ 4,999 97
Purchase, Production and Distribution of seeds and plants	3,700	3,640 94
Upkeep of Government Gardens and Grounds. ...	1,400	1,399 93

FRONT GARDEN.

Beds and Borders.

The seasons were not very favourable to annuals during the year, alternating as they did between extremes, and the less hardy varieties suffered accordingly. The Balsams however proved a valuable standby and a double variety gave some particularly good borders. Towards the end of the year the beds near the Front office carried a very good selection of Asters, which also did well in the window boxes. *Browallia speciosa*, too, proved an effective innovation in these beds.

The levelling of lawns and filling in of some of the minor drains in order to extend the scope of the motor mower was continued. A large heap of earth burnt in the latter part of the year enabled much needed repairs to the paths to be carried out. Further posts were erected to close the majority of paths south of the avenue to motor traffic.

Two plants of *Phlebotaenia Cowelli* set out in the previous year proved unsuited to their environment and were removed. A number of new plants, chiefly palms, were set out in the Front gardens and on the south side of the Chemistry Laboratory compound. These included *Callistemon acuminatus*, *Diospyros mollis*, *Erythrina corallodendron*, *Tristania conferta*, and the following palms : *Areca* sp., *Arecastrum Romanzoffianum*, *Butia capitata*, *B. Yatai*, *Erythea edulis*, *E. elegans*, *Euterpe stenophylla*, *Livistona olivaeformis*, *Martinezia erosa*, *M. Lindeniana*, *Orbignya martiana*, *Phoenix canariensis*, *P. dactylifera*, *Sabal* sp., *Scheelea* sp., *Trachycarpus excelsa*, *Thrinax floridana*, *Trithrinax acanthocoma* and *Washingtonia robusta*.

Lakes, and Aviaries.

The ' paaling ' of the edges of the lakes was continued, No. 1 lake and the canal between lakes Nos. 1 and 2 being completed. The bridge north of No. 2 island collapsed and was renewed.

Additions to the Aviary during the year included a pair of Cardinal birds, a pair of Troupials and a pair of ' Goldfinches.'

PARK LANDS.

The Park Lands were again maintained in order chiefly by Prison Labour. A number of new trees and Palms were planted on the avenue and elsewhere, including *Acacia richii, A. scorpioides, A. verticillata, A. visco, Bauhinia violacea, Bombax malabaricum, Cassia sophera, Diospyros mollis, Erythrina cristagalli, E. variegata var. orientalis, Jacaranda copaia, Lonchocarpus nitidus, Mesua ferrea, Mimusops caffra, Parkia Roxburghii, Pterocapus echinatus, Saraca indica. Sterculia lanceolata, Tabebuia rosea* and the following palms: *Areca sp., Butia alphonsii, B. bonneti, B, eriospathe, B. yatai, Livistona olivaeformis, Martinezia erosa, M. Lindeniana, Orbignya Dammeriana, Phoenix Canariensis, Sabal causiarum, S. princeps, S. sp., Trachycarpus excelsa and Thrinax floridana.*

During the year another of the few remaining old Oronoque trees on the avenue, relics of those existent when the Gardens were laid out, fell down.

The road leading to the stables, which had got into a very bad condition, was relaid with marl and surfaced with burnt earth.

The bamboo clump at the top of the avenue was stumped out, and the Hibiscus hedge from the Sugar Station entrance continued to meet the top of the avenue.

The benabs in the avenue were re-thatched with troolie leaves.

HEAD OFFICE GROUNDS.

The small circular bed opposite the front of the building was done away with, leaving an open lawn. The levelling of the lawns behind the office was continued.

Plants of *Ipomoea fistulosa* and *Calliandra Guildingii* were set out on either side of the Vlissengen Road between the Gardens' gates and the bridge south of the Gardens, and Primrose (*Asystasia gangetica*) planted on the grass under the Saman trees in the same section.

NURSERIES.

Ornamental Section.

General.—The Pergola east of the Director's lawn was extended to the north of the Mango beds by the erection of a number of arches over the grass path. Pink and white Barleria was planted as an edging on either side of the path and a number of climbers, including several varieties of Bougainvillaea, were planted to climb over the arches.

The Rockery was extended by the inclusion of another bed in this section of the nursery, and part of this was built up with marl in the form of a low wall with a bank sloping away from it on which plants could be set out.

A special bed was made for pink Anthurium Lilies near the Director's house, but it has still not been possible to get really satisfactory results with these plants.

A trough filled with very light soil was constructed to accommodate the various varieties of Hippeastrum which have been obtained recently. The plants grew well under the conditions provided and most of them flowered during the year.

A tree in the nursery, which was unknown and had not produced blossom within the memory of the present Garden staff, flowered during the year and was identified at Kew as *Phyllocarpus septentrionalis* Donn. Sm., a rare species, native of Guatemala. Unfortunately, no fruit was set.

Introductions.—New introductions obtained during the year, or which flowered for the first time, included some new Cannas from Hope Gardens, Jamaica, *Aristolochia elegans*, *A. ringens*, and *Hoya carnosa* from Florida, a double flowered variety of Pink Coralita, seed of a number of flowering trees, etc., together with cuttings of the 'Louis Wathen' variety of Bougainvillaea from Peradeniya, some Fotui trees (*Jacaranda copaia*) from the Forestry Department, seed of a number of ornamentals from Trinadad, *Gloriosa simplex* from Pretoria, seed of a further number of palm species from David Barry & Co. Los Angeles, and an assortment of seed from various other sources, including some species of Ipomoea and other climbers from the British Consulate at Gore, Western Abyssinia.

Orchids.—The collection was maintained in order, and a number of plants rebasketed or remounted on blocks with Osmunda fibre. Three new species of Oncidium were obtained from Trinidad. A plant of *Coryanthes macrantha* at Government House flowered twice during the year. In the nursery one or more plants of 68 species of orchids flowered during the year.

Economic Section.

Citrus.—The preparation of budded orange and grapefruit plants in fulfilment of orders was continued during the year and further assistance rendered to owners of private nurseries. The following table shows the distribution of budded citrus plants during the year.

TABLE I.

DISTRIBUTION OF BUDDED ORANGE AND GRAPEFRUIT.

	Demerara.					Berbice.	Essequibo.	Georgetown.	Total.
	East Coast.	West Coast.	East Bank.	West Bank.	Demerara River.				
Budded Orange ...	39	26	96	87	87	141	177	32	685
Budded Grapefruit ...	47	5	50	18	103	68	156	8	455
Totals ...	86	31	146	105	190	209	333	40	1,140

Orchard.—The orchard laid out in the Chemistry Laboratory compound was planted with the following trees: *Achras sapota* (a variety from U.S.A. Department of Agriculture), *Anona cherimolia*, *Punica granatum* (5 varieties from Palestine), *Persea gratissima* (4 varieties grafted from outstanding local pear trees), *Dipteryx odorata* (from the Forestry Department), *Aleurites fordii*, *A. montana*, a plant of King Orange, a specimen of the European Peach (*Prunus persica*), and a few papaw to supply fruit for the Aviary.

Arabian Coffee.—Experiments were carried out with the rooting of cuttings in the solar propagator and grafting on to Liberian coffee stock. In neither case were they successful.

Mangoes.—203 grafted plants were basketed during the year, many of these being obtained from the young trees at the Experiment Station. In the nursery *Indigofera endecaphylla* was extended over all the mango beds.

Mushrooms.—An attempt to cultivate mushroom spawn obtained from England, on a bed of Rice Straw and stable litter, was not successful.

Introductions.—These included a number of Peas and Beans from varied sources, amongst which were five varieties of the Adsuki Bean (*Phaseolus angularis*), the Cluster Bean (*Cyamopsis psoraloides*) from India, the Tepary Bean (*Phaseolus acutifolius* var. *latifolius*) from South Africa and the Mauritius Pea (*Pisum sativum*) from Trinidad. Though good germination was obtained in each case, with the exception of the Cluster Bean subsequent growth and fruiting was not very promising, and the Mauritius Pea proved quite unsuited to the Gardens. Three varieties of Sweet Corn were obtained from Messrs. Sutton's Calcutta branch, but all failed. Some plants of Christophene (*Sechium edule*) from Trinidad were again tried in the Vegetable Garden, but failed after a few months' growth, as they have always done previously. A plant of the Panchoi variety of Avocado Pear was

obtained from Trinidad. Some seed of Glovel Tomato was obtained from Florida and this variety appeared well suited to local conditions. Seed of a variety of *Coffea robusta* grown in the Bukoba district, Tanganyika, was received from East Africa, but failed to germinate.

TABLE II.

Plants put out in the Gardens	on parapets ...	...	20,590
	Shrubs, trees, etc.	...	335
„ basketed and potted	Ornamental ...	...	8,620
	Economic (except citrus)	...	2,951
„ ringed, layered and grafted	...	...	2,250
Seed sown	Ornamental (other than packets) ...	...	177
	Economic (other than citrus)	...	1,597
Citrus	Seedlings bedded out...	...	2,484
	„ budded ...	...	2,276
	Plants basketed ...	...	922

TABLE III.

PLANTS SOLD AND DISTRIBUTED DURING THE YEAR 1936.

Economic Section.			Ornamental Section.		
Budded Grapefruit:			Begonias...	...	109
Marsh ...	...	455	Crotons ...	...	44
			Hibiscus...	...	30
Budded Orange:			Ferns ...	...	197
Jaffa ...	...	28	Palms ...	...	339
King ...	...	29	Miscellaneous	...	938
Homosassa	...	14	Total		1,657
T.H. Late	...	22			
Navel ...	...	81			
Parson Brown	...	61			
Pine Apple	...	5	Bamboo Bundles	...	130
Lue Gim Gong	...	2			
Valencia	...	40			
West Bank	...	174			
Haag's Bosche	...	197			
Hope ...	...	32			
Lime ...	...	82			
Grafted Mangoes	...	167			
Do Pears	...	3			
Cacao Seedlings	...	449			
Coffee do	...	9			
Nutmeg ...	...	159			
Other economics	...	1,085			
	Total	3,094			

TABLE IV.

STATEMENT OF REVENUE RECEIVED FOR 1936 FROM BOTANIC GARDENS AND SALE OF GUIDE BOOKS.

Months.	Sale of Botanic Gardens Guides.	Sale of Plants.	Hire of Plants.	Sale of Pots.	Sale of Bamboo.	Sale of Lilies.	Miscellaneous delivery, Cuttings.	Total.
	$	$	$	$	$	$	$	$
January ...	.72	55.50	15.16	...	1.44	2.58	.36	75.76
February ...	5.20	24.86	...	...	.48	1.54	.72	32.80
March ...	5.76	19.34	.48	1.12	.24	.24	.12	27.30
April ...	1.44	17.94	.72	...	.24	.66	...	21.00
May ...	5.52	28.95	...	6.10	.88	3.40	.48	45.33
June ...	.48	18.32	1.44	...	1.44	1.12	.36	23.16
July ...	6.48	62.19	4.88	...	1.80	5.51	.64	81.50
August ...	3.12	61.79	...	...	1.68	3.87	.40	70.86
September ...	3.36	54.06	...	...	.76	3.42	.24	61.84
October ...	.48	20.74	.36	.12	2.48	2.74	.32	27.24
November ...	2.16	34.70	2.40	.36	.82	.26	...	40.70
December ...	3.60	69.01	...	.20	3.32	1.09	.56	77.78
	38.32	467.40	25.44	7.90	15.58	26.43	4.20	585.27

APPRENTICES.

Seven apprentices were employed during the year, and underwent instruction in the different sections of the Gardens and Experiment Stations. One boy was dismissed during the year and another taken on in his place.

GOVERNMENT HOUSE GARDENS AND PUBLIC BUILDINGS.

A number of further alterations and additions were made to the gardens at Government House. The miscellaneous trees, palms, etc. in the oval opposite the Main Street Gate were cleared away with the exception of one Flamboyante tree in the centre, and the Hibiscus on the western side, which was left to screen the view from the gate. The raised bed remaining was grassed. Grass was also planted to continue the lawn by the Flagstaff up to the cherry hedge. A small lily pond with a fountain was made in a corner on the western side of the garden. The roses near Main Street were transplanted to a new bed by the laundry and the separate beds which they had occupied made into one and planted with a number of different varieties of standard Hibiscus. A great improvement was effected by having the electric cables, etc., which formerly crossed the middle of the Garden on poles, laid underground. Several new frameworks were put up in the borders on which to train flowering creepers as screens. A rockery was made near the the New Market Street gate.

Some new plants of Bougainvillaea, var. Helen McLean, were set out on the pergola near the porch and by the steps to the gallery. The Heliconia on the front lawn was replaced by a plant of Carib Wood (*Sabinea carinalis*). A number of new rose varieties from England have been introduced to the garden, also some new Dahlias.

TEACHERS' TRAINING COURSE.

At the beginning of the year 16 teachers attended a five months' course of training in Rural Science and Elementary Agriculture under the aegis of the Department. This course included instruction in gardening and elementary horticulture. An area at the Eastern end of the Chemistry Laboratory compound was laid out so that each teacher had a plot containing 8 beds, seven of which were planted with different varieties of vegetables and one, rather larger than the rest, with ornamental plants.

The students prepared and planted their own beds, under the direction of the Horticultural Assistant, cultivated the crops grown thereon, and finally turned the ground up and sowed a cover crop on it when the course was ended. On one day a week an hour's practical instruction was given by either the Horticultural Assistant, the Nursery Foreman, or the Herbarium Assistant, in various aspects of horticulture, nursery work and on the commoner varieties of ornamental plants cultivated in the Botanic Gardens. A test was held during the course, and an examination at the end of it.

ANTIDESMA.

Eradication of this weed from the D'Urban Park Race course, begun and almost finished during the previous year, was completed as far as the Western boundary of the Government Stock Farm.

E. B. MARTYN,
Superintendent, Botanic Gardens.

January 15, 1937.

DEPARTMENT OF AGRICULTURE.

REPORT ON THE VETERINARY DIVISION FOR THE YEAR 1936.

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REPORT ON THE VETERINARY DIVISION FOR 1936.

STAFF.

T. Bone, O.B.E., M.R.C.V.S.—Veterinary Surgeon.

GENERAL.

1. Routine visits were made to the Breeding Stations and the Police Stables and imported animals were inspected at the wharves.

GOVERNMENT BREEDING STATIONS.

2. *Distribution of Stock*—

Georgetown.	—5 Holstein Friesian bulls,
	2 Guernsey bulls.
	1 Cow 2 heifers—Holstein-Friesian.
	1 Cow 2 heifers—Creole.
	1 Boar 4 Sows—Canadian Berkshire.
	8 Pens Poultry, 4 Pens Ducks.
	1 Jack, 2 Colts, 2 working donkey mares
Leguan.	—1 Guernsey bull, 1 Pen Poultry.
Forest Station.	—1 Holstein Friesian Bull.

3. *Services* by bulls —359. By Jack Donkey—23.

4. *Sales.*—Cattle 4 bulls, 1 cow—Holstein Friesians.
Pigs.—1 Boar, 1 Sow, and 53 Young stock.
Poultry.—78 Young Stock, 3,796 eggs.
Ducks.—11 Young Stock, 425 eggs.

5. *Forage Plants.*—Guatemala grass, *Indigofera endecaphylla*, Teosinte and Demerara Primrose were distributed to farmers.

6. *Revenue.*—Sale of stock, eggs, stud and inspection fees gave a revenue of $1,437.12.

7. *Buildings.*—The cow stable was demolished and a bull stable erected on the site. A barn for the storage of rice straw for bedding, and an Incubator house were built.

The pig paddocks were extended to provide one large paddock for dry sows, and two small paddocks for each sow with a litter. This extension saves the labour and expense of moving to a new site after the summer and winter rains.

The poultry section has been extended to provide accommodation for rearing young stock.

The main trenches have been deepened and bridges built. Three additional paddocks for cattle, each with a water supply have been erected. Shade trees have been planted.

ANIMAL HEALTH.

8. A few carcases and parts of carcases were condenmed in the Berbice Abattoir on account of Tuberculosis. The Kidney worm is a common parasite of pigs in Berbice.

Infections vaginitis has caused considerable trouble in breeding on the East Bank, Demerara River.

An Animal Diseases Ordinance was passed by the Legislative Council at the close of the year.

ANIMAL HUSBANDRY.

9. *Beef Cattle.*—One Hereford bull was imported by a ranching Company. The few slaughter cattle of Hereford grade from the interior are a great improvement on the type of cattle sent from the savannahs, and clearly indicate the lines on which the Rupununi savannahs could be developed under good management. Many more bulls are required. The condition of the creole slaughter cattle received at the abattoir continues to be poor due to the heavy overstocking of the limited grazing areas on the coast. There is only one market price for cattle irrespective of condition and most cattle owners depend on age to give increased weight. The freight for railway transport is low, but Berbice cattle dealers continue to drive cattle along the Public Road, a distance of sixty-nine miles to the city.

10. *Dairy Cattle.*—Improved transport facilities have tempted more and more cattle-owners to sell milk. Few of them own improved dairy stock. As the average creole cow yields only sufficient milk to rear a calf all milk is sold at the expense of the young stock. In the older milk selling areas the starvation of calves has caused a definite deterioration of the type of cattle, and unless improved methods of rearing are adopted by the new milk sellers there will be deterioration over a wide area. An increase in the number of dairy stock is not so much a matter of the provision of improved bulls as a limit to the sale of milk in order to rear calves properly, at present the mortality is high. The provision of more fodder is urgently needed but few owners are sufficiently interested in their animals to grow forage crops.

The number of owners who rear improved dairy calves properly is few in spite of it being generally known that such animals on reaching maturity are profitable. A number of Holstein-Creole first cross have been successfully reared on the Abary savannahs and heifers with first calf have produced ten pints of milk at the morning milking without any supplementary ration being fed. Excellent results have been obtained near the city with well managed cattle as is shown in the following statement of milk records.

MILK RECORDS OF GRADE CATTLE.

Lactation.	Holstein-Creole 1st Cross.		Lactation.	Holstein-Creole 2nd Cross.	
Period.	No. of Days.	Yield lb.	Period.	No. of Days.	Yield lb.
1	396	5,275	1	314	5,452
4	272	6,014	1	306	5,080
5	345	6,222	1	290	5,260
6	300	6,470	2	392	7,912
		Not complete—	2	298	8,080

11. *Swine.*—A few rice-millers and coconut oil factory owners are paying more attention to the breeding of pure-bred pigs.

The eight litters of the four Canadian Berkshire sows this year gave an average number of 8.5 farrowed and 6.9 reared. Rigglings are not reared. The average weight at 8 weeks was 38.2 lb.

12. *Poultry.*—The high temperature of 85% to 90 F. and the great humidity is a handicap to the incubation of eggs. The best results are obtained with eggs which are not more than five days old. Chicks hatched from these eggs are robust, require little artificial heat, and are on the ground after seven days.

Rhode Island Red, Wyandottes, Plymouth Rocks, and Leghorns have been kept at the breeding station for some years; the Rhode Island Red have given the best results.

T. BONE,
Government Veterinary Surgeon.

February 5, 1937.